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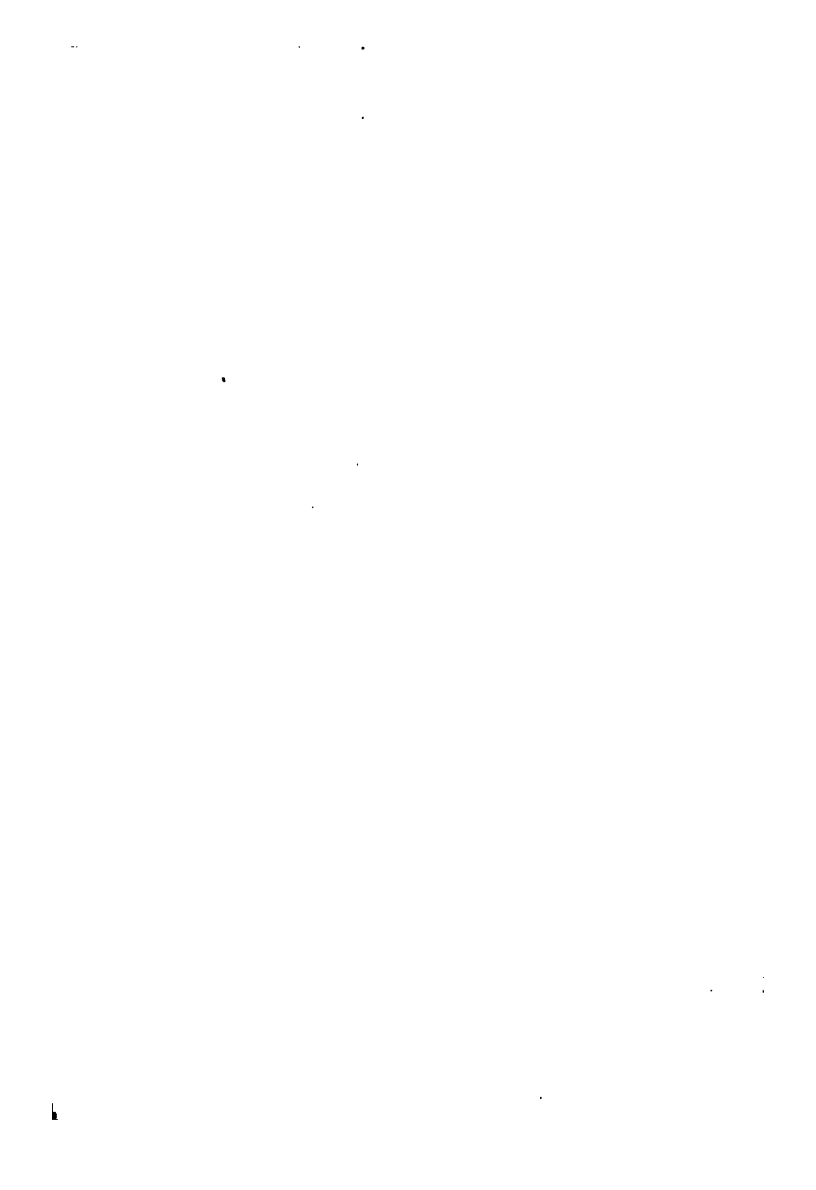
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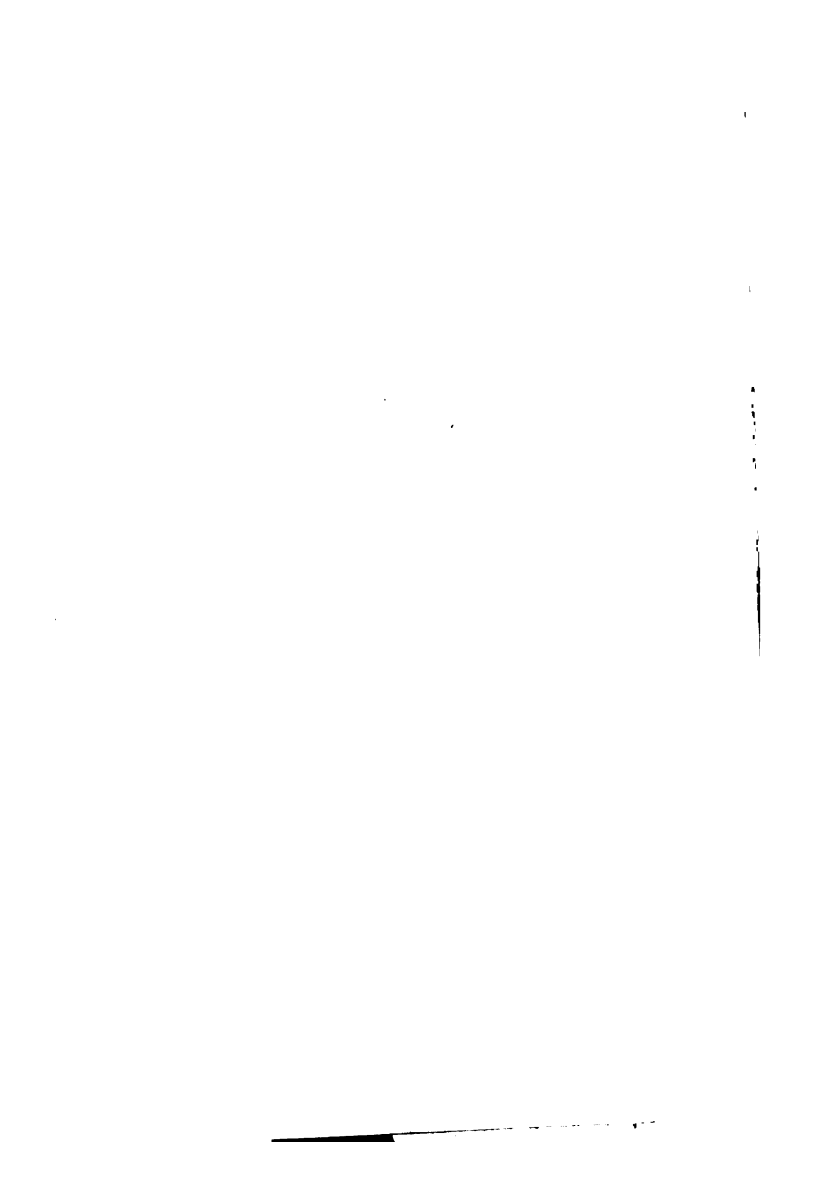
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78

# HUNTER'S STANDARD ARITHMETIC

A GRADUATED SCHEME OF ARITHMETICAL EXAMPLES

ADAPTED TO THE REGULATIONS OF

THE NEW CODE

BY THE

REV. JOHN HUNTER, M.A.

AUTHOR OF 'A STANDARD ALGEBRA'

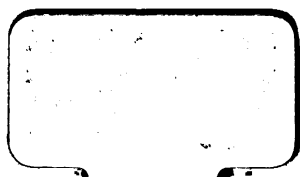
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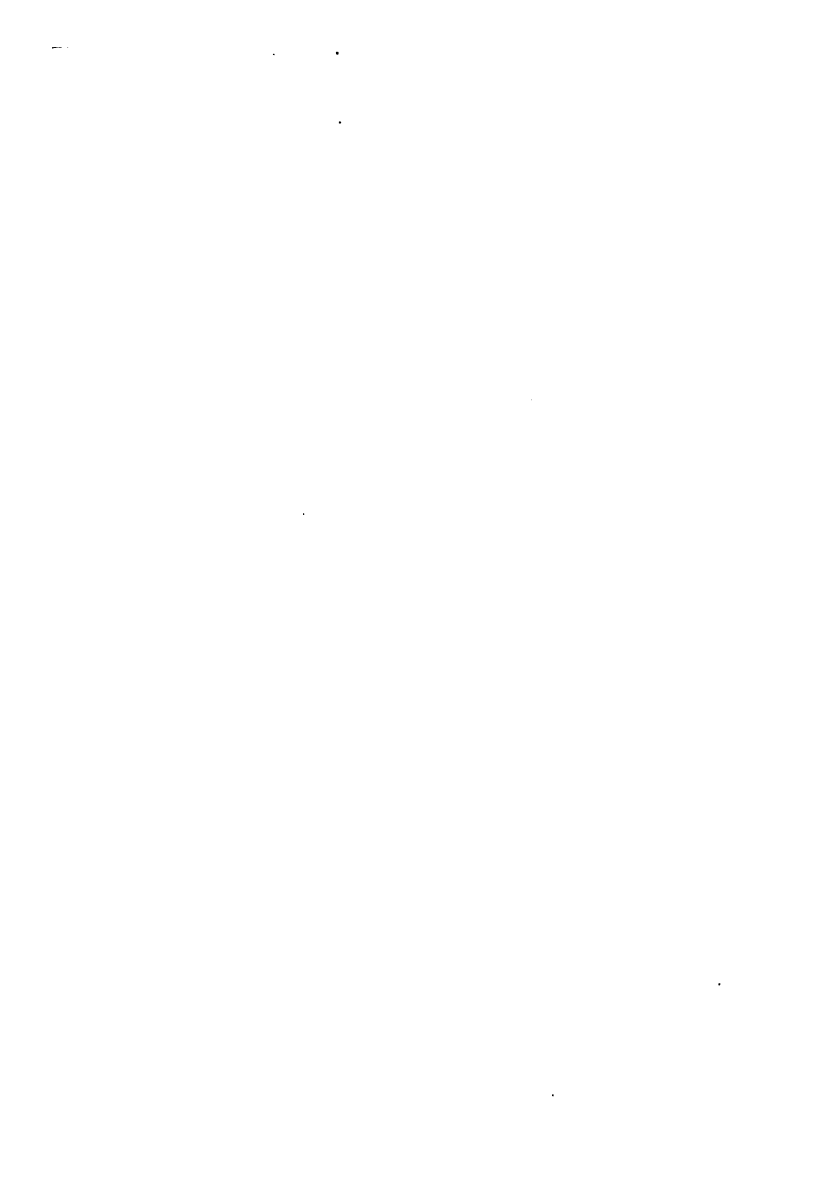
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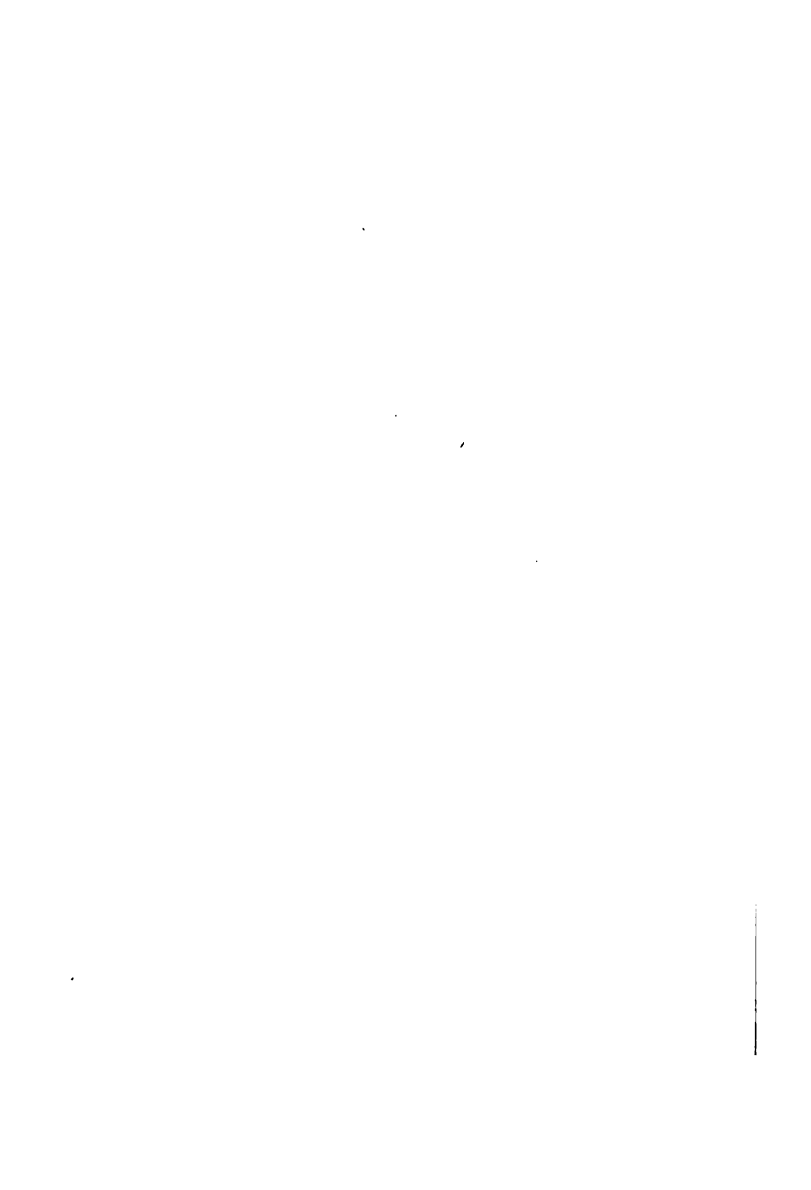
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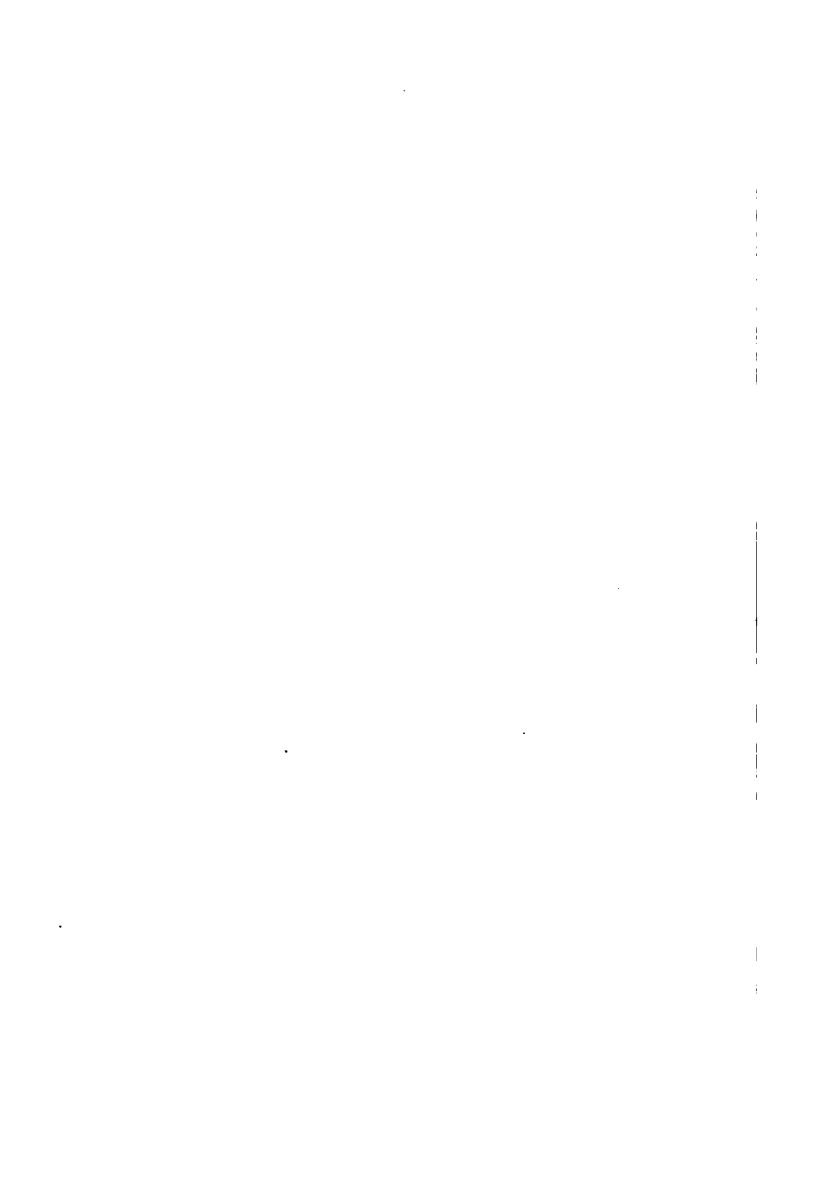












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1878

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## ADVERTISEMENT.

IN this ARITHMETICAL MANUAL, which is adapted for School Board, National, and other Elementary Schools, the special work of successive Standards is as follows :

### *PART I.*

Standard	I.	includes	Exercises	1-3.
"	II.	"	"	4-7.
"	III.	"	"	8-11.

### *PART II.*

Standard	IV.	includes	Exercises	12-17.
"	V.	"	"	18-20.

### *PART III.*

Standard	VI.	includes	Exercises	21-50.
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# STANDARD ARITHMETIC.

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## PART I.

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### EX. 1.

#### NOTATION.

WRITE successively downwards the figures expressing the following numbers, making the units form one column, the tens another, &c.

(1) Seventeen; thirty-five; twelve; forty; fifty-six; seventy-eight.

(2) Sixty; seventy-two; nineteen; fifty-three; eleven; eighty-four.

(3) Ten; ninety-one; six; fifty; seventy-five; nine.

(4) Eighty-one; eight; fifteen; seven; thirteen; thirty-one.

(5) Five; sixty-five; twenty; forty-four; three; ninety-seven.

(6) Sixteen; twenty-two; nine; seven; ten; seventy.

(7) Ninety; one hundred and sixty-eight; one hundred and five; seventy-three; one hundred and sixteen; one hundred and twenty.

(8) One hundred; one hundred and ten; one hundred and one; two hundred; one hundred and forty-nine; twelve.

(9) Eighty; two hundred and two; sixty-seven; three hundred and fifty-six; two hundred and nineteen; one hundred and twelve.

(10) Three hundred and sixty-five; one hundred and forty; two hundred and fourteen; three hundred and seven; seventy-six; one hundred and eighteen.

(11) Five hundred and three; four hundred and forty; six hundred and eleven; seven hundred and seventeen; three hundred and ninety-two; eight hundred and ten.

(12) Nine; ninety; one hundred and nineteen; nine hundred; two hundred and thirteen; eighty-five.

(13) Five hundred; four hundred and four; eight hundred and seventy; six hundred and sixty-six; one hundred and fourteen; three hundred and eighty-one.

(14) Six hundred and twenty-five; seventy-nine; eight; two hundred and seven; nine hundred and nine; thirty-seven.

(15) Three hundred and sixteen; six hundred and thirteen; five hundred and five; four hundred; seven hundred and thirty; seven hundred and twelve.

(16) Four hundred and one; eight hundred and eighteen; three hundred and eleven; five hundred and fifteen; one hundred and ninety-nine; two hundred and seven.

(17) One thousand ; two thousand four hundred and twenty-one ; six thousand three hundred and thirteen ; three thousand five hundred and seven ; three thousand six hundred and ten ; six hundred and six.

(18) Four thousand five hundred ; two thousand and thirty-six ; one thousand and nineteen ; five hundred and thirteen ; three thousand eight hundred and sixty-nine ; five thousand and five.

(19) Four thousand and four ; seven thousand nine hundred and twelve ; one thousand and fifty ; three thousand and eleven ; two hundred and ten ; two thousand and seventy.

(20) Eight hundred and four ; one thousand nine hundred and sixty-four ; three thousand ; eleven hundred ; nine hundred and nineteen ; nine thousand and nine.

(21) A hundred and one ; a thousand and one ; six thousand and thirteen ; nine hundred ; four thousand five hundred and sixty ; two thousand and forty-four ; eight thousand eight hundred and eight.

(22) Four thousand seven hundred ; four thousand and nineteen ; six thousand four hundred and three ; eight thousand six hundred and seventy-five ; two thousand five hundred and fifteen ; nine thousand and ninety ; one thousand one hundred and sixteen.

(23) Three thousand nine hundred and twenty-two ; two thousand and twelve ; twelve hundred ; seventeen hundred and seventy-seven ; five thousand and eight ; six hundred ; four thousand five hundred and fifty.

(24) Nine hundred and fifteen ; one hundred and eleven ; five thousand three hundred and fifty-seven

two thousand and four; nine thousand and thirteen; nine thousand three hundred; four thousand and sixty.

(25) Forty-two thousand three hundred and sixty-seven; thirty-two thousand six hundred and thirty; twelve thousand five hundred and one; six thousand and eight; twenty thousand nine hundred and eleven; seven thousand and ten; seventeen thousand and seven.

(26) Twenty thousand six hundred and twelve; fourteen thousand; thirty-three thousand four hundred; sixty thousand and sixteen; eight thousand five hundred and sixty-three; eighty thousand six hundred and thirty; four thousand seven hundred and nine.

(27) One thousand eight hundred and fifteen; eleven thousand and ten; thirty thousand; eighteen hundred and eighty; sixty thousand six hundred and six; two hundred and ninety; two thousand and nine.

(28) Seventeen thousand two hundred and forty-nine; eighty-six thousand seven hundred and fifty; ten thousand and twenty-eight; thirty-four thousand and eighteen; twelve thousand four hundred; sixty-three thousand and twelve; eighty thousand and eighty.

### Ex. 2.

#### SIMPLE ADDITION.

(1) 3	(2) 4	(3) 6	(4) 7	(5) 8	(6) 6	(7) 4
1	2	2	8	3	6	8
<u>4</u>	<u>5</u>	<u>8</u>	<u>3</u>	<u>9</u>	<u>7</u>	<u>6</u>

(8) Six, nine, and four; also, Eight, five, and six.

(9) Five, four, and seven; also, Seven, eight, and five.

(10) Two, seven, and eight; also, Nine, seven, and six.

(11) Eight, one, and nine; also, Four, eight, and nine.

(12) Eight, eight, and seven; also, Six, seven, and eight.

(13) Nine, eight, and eight; also, Seven, nine, and eight.

(14) 5	(15) 8	(16) 7	(17) 9	(18) 2	(19) 7	(20) 6
7	4	4	1	8	7	8
4	2	5	4	7	7	6
2	3	6	9	4	8	5
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

(21) Three, nine, seven, four; also, Five, seven, six, six.

(22) Two, nine, six, four; also, Six, four, seven, five.

(23) Six, six, four, nine; also, Nine, five, five, six.

(24) Nine, six, seven, eight; also, Seven, two, eight, six.

(25) One, nine, nine, six, four.

(26) Four, eight, nine, eight, six.

(27) Seven, six, eight, five, seven.

(28) Nine, nine, seven, nine, nine.

(29) Three, eight, seven, eight, six, nine.

(30) Five, eight, nine, seven, seven, eight.

(31) Eight, nine, six, five, six, eight.

(32) Eight, eight, eight, nine, nine, seven.

(33) Five, five, four, two, three, six, two.

(34) Three, nine, six, two, five, seven, eight.

(35) Seven, two, one, seven, four, six, nine.

(36) Five, four, six, six, six, seven, nine.

- (37) Two, eight, one, three, four, five, nine.  
 (38) Nine, nine, four, seven, seven, five, three.  
 (39) Six, five, nine, three, six, four, seven.  
 (40) Four, eight, two, seven, seven, seven, eight.  
 (41) Nine, eight, nine, nine, eight, eight, four.  
 (42) Seven, nine, eight, nine, eight, six, nine.  
 (43) Four, nine, seven, two, nine, eight, seven, six,  
 seven.  
 (44) Eight, three, nine, four, five, eight, eight, eight,  
 nine.  
 (45) Nine, eight, seven, nine, six, seven, nine, eight,  
 seven.  
 (46) Five, seven, six, nine, nine, eight, nine, four,  
 seven.  
 (47) Twelve, four, ten, nine, ten, nine, eight, ten,  
 eight.  
 (48) Fifteen, nine, ten, seven, nine, ten, seven, seven,  
 eight.  
 (49) Thirty-six, eight, ten, nine, six, four, ten, six,  
 six.  
 (50) Twenty-five, nine, five, ten, six, six, four, ten,  
 nine.

(51) 63	(52) 68	(53) 50	(54) 9	(55) 47	(56) 93
96	65	46	36	6	98
35	29	89	75	90	74
40	76	17	7	88	97
16	74	38	67	76	80
90	19	54	18	8	50
<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>

- (57) Find the several amounts of twice the numbers  
 —10, 46, 73, 11, 58, 12, 29.

(58) 35	(59) 79	(60) 13	(61) 67	(62) 99	(63) 79
46	85	39	70	69	88
57	96	7	88	82	97
68	99	6	98	74	89
79	68	86	86	66	78
8	77	96	59	50	67
37	93	5	65	17	89
8	89	8	29	64	98
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

(64) Find the several amounts of twice the numbers  
—64, 17, 95, 37, 68, 89.

(65) Find the several amounts of thrice the numbers  
—64, 53, 27, 78, 19, 86.

(66)  $86 + 63 + 78 + 79 + 57 + 35 + 84 + 98 + 29$ .

(67)  $74 + 88 + 37 + 59 + 40 + 85 + 73 + 90 + 68$ .

(68)  $57 + 67 + 94 + 89 + 78 + 69 + 80 + 70 + 69$ .

(69)  $81 + 78 + 97 + 62 + 9 + 48 + 84 + 97 + 8$ .

(70)  $48 + 84 + 98 + 89 + 67 + 76 + 87 + 78 + 37$ .

(71) 254	(72) 176	(73) 78	(74) 404	(75) 843
528	960	468	893	384
837	880	500	616	234
609	758	787	95	567
772	456	609	87	890
460	789	326	760	908
365	67	897	512	717
917	89	86	115	688
187	809	550	999	659
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

(76) Find the several amounts of twice the numbers  
—286, 572, 194, 359, 807.

(77) What are the several amounts of thrice the  
numbers—356, 827, 173, 450, 968?

(78)  $369 + 756 + 832 + 94 + 87 + 608 + 716 + 888 + 550$ .

(79)  $776 + 365 + 90 + 690 + 800 + 508 + 73 + 987 + 98$ .

(80)  $96 + 82 + 79 + 565 + 498 + 987 + 614 + 68 + 86$ .

(81)  $493 + 273 + 808 + 956 + 981 + 545 + 717 + 629 + 366$ .

(82)  $615 + 509 + 687 + 768 + 95 + 47 + 59 + 407 + 160$ .

(83)  $39 + 79 + 606 + 800 + 897 + 58 + 68 + 912 + 97$ .

(84)  $286 + 375 + 497 + 564 + 638 + 159 + 749 + 824 + 906$ .

(85)  $596 + 458 + 687 + 849 + 773 + 635 + 960 + 922 + 120$ .

(86)  $485 + 675 + 691 + 836 + 493 + 783 + 278 + 569 + 695$ .

(87) How much is twice each of the numbers—59, 365, 908, 86, 974?

(88) How much is thrice each of the numbers—87, 635, 790, 194, 58?

(89) 4362	(90) 6095	(91) 837	(92) 2345
6494	698	649	6789
3809	1923	3675	1234
7639	8659	2964	5678
5647	865	365	9999
8618	471	6196	3456
9010	2286	4728	7890
<u>4683</u>	<u>7005</u>	<u>4474</u>	<u>4567</u>

(93) How much is 4 times 285, 4790, 3658, 7406?

(94) Find the amount of 5 times 7243, 615, 8479, 5006.

(95) Add into one sum Five thousand seven hun-



dred and eighty-six, Nine thousand six hundred and nine, Two thousand eight hundred and fifteen, Six thousand nine hundred and forty-seven, Six thousand and twelve, Eight thousand five hundred, Three thousand and eight, Seven thousand five hundred and ninety-four.

(96) Add together Three thousand six hundred and forty-nine, One thousand nine hundred and seventy-eight, Five thousand and eighty-three, Seven thousand nine hundred and sixty, Four hundred and fifty-seven, Six thousand seven hundred and eighty-nine, Four thousand and nineteen, Six hundred and six.

(97) Find the sum total of Seven thousand two hundred and twenty, Four thousand and fifty-nine, Seven thousand seven hundred and eighty-five, Nine thousand six hundred and eighty-one, Twelve hundred and sixty, Fourteen hundred and ninety-four, Three thousand and thirty, Eight thousand five hundred and twenty-nine.

(98) Find twice 7463, 4815, 2709, 6084.

(99) „ thrice 796, 1685, 2473, 8169.

(100) „ 4 times 1457, 683, 8940, 3725.

(101) „ 5 times 4168, 2507, 8293, 6789.

(102) What is the sum of Six thousand and thirty-five, Eight hundred and eighteen, Eight thousand six hundred and ten, Nine hundred and seven, Seven hundred and ninety-six, Nine thousand and nineteen, Four thousand eight hundred and sixty-three, Five hundred and seventy-nine, Three thousand and ninety?

(103) Add together Eleven hundred and seven, One thousand seven hundred and twenty, Five thousand eight hundred and ninety-six, Four thousand seven hundred and thirty-eight, One thousand and ninety-nine,

Two thousand nine hundred and sixty-four, Three thousand and seventeen, Four thousand three hundred and eighty-five, Five thousand one hundred and seventy-four.

(104) Add together Four thousand five hundred and sixty-seven, Seven thousand six hundred and forty-five, Six thousand seven hundred and eighty-nine, Nine thousand eight hundred and sixty-seven, Thirteen hundred and eighty, Three thousand four hundred and fifty-six, Seven thousand seven hundred and eighty-eight, Eight thousand nine hundred and one, Nine thousand and sixteen.

(105) Find 4 times 2736, 4975, 3048, 1592.

(106) „ 5 times 3746, 1582, 6094, 5387.

(107) What is the sum of Eight thousand one hundred and five, Seven hundred and sixty-five, Ninety-eight, Three hundred and seventy-four, Four thousand and eighty-six, Five thousand and eleven, Eighty-seven, Six hundred and seventy-eight, Six thousand and seventy ?

(108) Find the sum of Two hundred and seven, Two thousand and eight, Five thousand nine hundred and ninety-nine, Four hundred and sixty-five, Seven hundred and eighty-five, Six hundred and eighteen, Fourteen hundred and four, Seven thousand six hundred and fifty-four, Nine thousand eight hundred and seventy-six.

(109) Add into one sum Eight thousand eight hundred and eight, Four thousand six hundred and eighty, Two thousand four hundred and sixty-eight, Seven thousand eight hundred and ninety-nine, Eight thousand nine hundred and eighty-seven, Nine thousand seven hundred and seventy-six, Eight thousand five hundred

and sixty-four, Seven thousand eight hundred and ninety-eight, Six thousand nine hundred and seventy-five.

- (110) Find the amounts of 3 times 10, 19, 12, 37, 11.  
 (111)     "     "     4 times 12, 26, 11, 10, 40.  
 (112)     "     "     5 times 11, 58, 10, 60, 12.  
 (113)     "     "     6 times 10, 49, 38, 12, 11.  
 (114)     "     "     6 times 57, 16, 24, 95, 80.  
 (115)     "     "     10 times 463, 604, 1520.  
 (116)     "     "     11 times 365, 442, 1653.  
 (117)     "     "     12 times 506, 234, 1645.

**Ex. 3.**

## SIMPLE SUBTRACTION.

- |  |   |  |  |  |   |
|--|---|--|--|--|---|
| (1) $\begin{array}{r} 68 \\ 43 \\ \hline \end{array}$    | (2) $\begin{array}{r} 79 \\ 25 \\ \hline \end{array}$   | (3) $\begin{array}{r} 54 \\ 16 \\ \hline \end{array}$    | (4) $\begin{array}{r} 71 \\ 25 \\ \hline \end{array}$    | (5) $\begin{array}{r} 66 \\ 58 \\ \hline \end{array}$    | (6) $\begin{array}{r} 98 \\ 30 \\ \hline \end{array}$ |
| (7) $\begin{array}{r} 820 \\ 213 \\ \hline \end{array}$  | (8) $\begin{array}{r} 542 \\ 368 \\ \hline \end{array}$ | (9) $\begin{array}{r} 365 \\ 107 \\ \hline \end{array}$  | (10) $\begin{array}{r} 605 \\ 506 \\ \hline \end{array}$ | (11) $\begin{array}{r} 920 \\ 360 \\ \hline \end{array}$ |   |
| (12) $\begin{array}{r} 349 \\ 169 \\ \hline \end{array}$ | (13) $\begin{array}{r} 800 \\ 95 \\ \hline \end{array}$ | (14) $\begin{array}{r} 678 \\ 184 \\ \hline \end{array}$ | (15) $\begin{array}{r} 913 \\ 450 \\ \hline \end{array}$ | (16) $\begin{array}{r} 700 \\ 607 \\ \hline \end{array}$ |   |
| (17) $\begin{array}{r} 620 \\ 28 \\ \hline \end{array}$  | (18) $\begin{array}{r} 253 \\ 48 \\ \hline \end{array}$ | (19) $\begin{array}{r} 849 \\ 250 \\ \hline \end{array}$ | (20) $\begin{array}{r} 461 \\ 63 \\ \hline \end{array}$  | (21) $\begin{array}{r} 190 \\ 94 \\ \hline \end{array}$  |   |
| (22) Subtract 192 from 2 times 438.                      |   |  |  |  |   |
| (23)     "     96     "     3 times 297.                 |   |  |  |  |   |
| (24)     "     409     "     4 times 226.                |   |  |  |  |   |
| (25)     "     80     "     5 times 168.                 |   |  |  |  |   |
| (26)     "     847     "     6 times 157.                |   |  |  |  |   |

- |                   |                   |
|-------------------|-------------------|
| (27) 6210 - 2418. | (28) 1877 - 792.  |
| (29) 8326 - 2860. | (30) 5401 - 1388. |
| (31) 9037 - 2273. | (32) 1001 - 99.   |
| (33) 6000 - 1022. | (34) 4613 - 808.  |
| (35) 7272 - 4913. | (36) 1010 - 41.   |

- (37) Subtract 97 from 2 times 597.  
(38)     "     180     "     3 times 386.  
(39)     "     2909    "     4 times 974.  
(40)     "     88     "     5 times 795.  
(41)     "     599    "     6 times 268.

(42) From Eight thousand seven hundred and fifty-two take away Four thousand nine hundred and eighty.

(43) How much is the difference between Two thousand and ninety-five and Three thousand and three ?

(44) How much greater is Six thousand seven hundred and eighty-nine than Eight hundred and sixty-four ?

(45) What remains when Nine hundred and sixty-six has been subtracted from Nineteen hundred and twenty-six ?

(46) How much does Nine thousand and twenty-four exceed Eighty ?

(47) The sum of two numbers is 5678, the greater of the two being Four thousand seven hundred and two. Find the smaller number.

(48) How much less than Seven thousand is Seven hundred and sixty-six ?

(49) Find the remainder left after subtracting One thousand seven hundred and thirty-six from Two thousand three hundred and forty-five.

(50) Find the difference of the numbers Eight hundred and five and Two thousand and four.

(51) Subtract 749 from the sum of  $819 + 456 + 79$ .

(52) „ 218 „  $726 + 535 + 919$ .

(53) „ 505 „  $658 + 978 + 867$ .

(54) „ 918 „  $365 + 84 + 962$ .

(55) „ 645 from 10 times 645.

(56) „ 2929 from 11 times 546.

(57) „ 253 from 12 times 253.

(58) „ 3 times 365 from 4 times 364.

(59) „ 6 times 689 from 5 times 986.

#### EX. 4.

#### SIMPLE ADDITION AND SUBTRACTION.

(1) Add together Thirty-five thousand eight hundred and twenty, Seventeen thousand nine hundred and six, Twenty-four thousand one hundred and seventy-eight, Nine thousand six hundred and sixteen, Ten thousand nine hundred and forty-nine, Forty-five thousand and fifteen, Sixty-six thousand six hundred, Eighteen hundred and seventy-seven.

(2) Find the sum of Sixty-three thousand and ninety, Eight thousand seven hundred and fifty-nine, Twelve thousand and twelve, Seventy thousand and ninety-four, Seven thousand eight hundred and four, Nine hundred and forty-seven, Fifty-six thousand seven hundred and eighty-nine, Eight thousand and eight.

(3) Collect into one amount A hundred and seventy-five thousand nine hundred and eighty-four, Three hundred and sixty-seven thousand five hundred and

ninety-six, Twenty-nine thousand and fifteen, Eighty thousand and fifty-seven, Six hundred and fifty thousand nine hundred and sixty-nine, Eight hundred and seven thousand and seven, Three hundred and sixty-five thousand three hundred and sixty-five, Four hundred and nine thousand and nineteen.

(4) What is the sum of Seven million seven hundred and thirty-two thousand eight hundred and eighteen, Five million sixty-seven thousand three hundred and eighty-four, Thirty million nine hundred and eight thousand and sixty-seven, Thirteen million thirteen thousand and thirty, Eight million five hundred and eight thousand seven hundred and eighty-nine, Eight hundred and sixty-six thousand and fourteen, Fifty-seven million seven thousand nine hundred, Nine million ninety-one thousand and sixty-five?

(5) Subtract Nine thousand three hundred and ninety from Sixty thousand three hundred and eighty-three.

(6) By how much does Twenty-one thousand and ten exceed One thousand nine hundred and forty-four?

(7) Find the difference between Six hundred and fifty-three thousand and Sixty thousand and fifty-three.

(8) If Three million ten thousand five hundred and fifty be subtracted from Eleven million one thousand and ten, what will be the remainder?

(9) What number must be added to Fifty thousand three hundred and ninety-six to make up a million?

(10) How much greater is the difference of One hundred and thirty-six million thirty-seven thousand five hundred and forty-two, and Forty-eight million nine hundred and sixty thousand five hundred and

thirty-nine, than the sum of Fifty-six million eight hundred and ninety-four thousand and seven + Seven million eighty-seven thousand nine hundred and sixty-five + Eighteen million seven hundred and eighty-six thousand seven hundred and eighty-one?

(11) A school of 140 boys is divided into three classes; there are 53 boys in the first class, and 39 in the second: how many are there in the third?

(12) A man born in the year 1808 lived 65 years: in what year did he die?

(13) In the year 1876 a man died at the age of four-score: in what year was he born?

(14) Five sides of bacon weigh respectively 53, 55, 56, 59, and 60 pounds: how much more or less would the whole weight be, if the weight of each side were 58 pounds?

(15) Thirteen sides of bacon weighed altogether 740 pounds. If six of them had been each 5 pounds lighter, and the rest each 2 pounds heavier, how much less would the whole weight have been?

**Ex. 5.**

## SIMPLE MULTIPLICATION.

(1) 7368 2 —	(2) 90175 2 —	(3) 48172 3 —	(4) 169058 3 —
(5) 6375 4 —	(6) 29486 2 —	(7) 18492 4 —	(8) 963075 3 —
(9) 4962 5 —	(10) 67483 4 —	(11) 37185 5 —	(12) 296358 6 —

(13) 7419 6	(14) 86974 5	(15) 45283 6	(16) 509483 7
(17) 4627 7	(18) 59462 8	(19) 31589 7	(20) 730856 8
(21) 6859 9	(22) 17394 9	(23) 47839 8	(24) 726580 9
(25) $52748 \times 9 \times 8 \times 7$ .	(26) $6095479 \times 12 \times 11 \times 10$ .		
(27) $64953 \times 8 \times 9 \times 7$ .	(28) $3128765 \times 11 \times 12 \times 10$ .		
(29) $19786 \times 9 \times 7 \times 8$ .	(30) $4700986 \times 12 \times 10 \times 11$ .		
(31) $85794 \times 40 \times 50$ .	(32) $4975813 \times 110 \times 100$ .		
(33) $60958 \times 60 \times 70$ .	(34) $8590647 \times 120 \times 110$ .		
(35) $53678 \times 80 \times 90$ .	(36) $3829580 \times 100 \times 120$ .		

Multiply separately—

(37) 6492 by 13 and 17.	(38) 829463 by 18 and 19.
(39) 6918 by 21 and 43.	(40) 372859 by 53 and 46.
(41) 1894 by 27 and 58.	(42) 657349 by 64 and 73.
(43) 3756 by 59 and 87.	(44) 162875 by 68 and 93.
(45) 7948 by 51 and 26.	(46) 237508 by 82 and 94.
(47) 6197 by 72 and 35.	(48) 761953 by 34 and 99.
(49) 1968 by 31 and 49.	(50) 583796 by 67 and 85.

(51) Multiply the sum of 73691 + 12806 by 115.

(52) Multiply the difference of Eight million eighteen hundred and Three hundred and one million ten thousand four hundred and seventy-five, by 312.

(53) 4586379 154	(54) 9736854 268	(55) 6491578 317
(56) 2836095 194	(57) 1967358 365	(58) 8537491 428



(59) 7720908 507 <hr/>	(60) 571638 290 <hr/>	(61) 6372940 840 <hr/>
(62) 409360 6300 <hr/>	(63) 4536000 5710 <hr/>	(64) 7995846 648 <hr/>
(65) 7019280 279 <hr/>	(66) 1845096 735 <hr/>	(67) 3857926 546 <hr/>
(68) 9695730 409 <hr/>	(69) 9827350 380 <hr/>	(70) 537289 1690 <hr/>
(71) 2794039 726 <hr/>	(72) 1592618 1205 <hr/>	(73) 99364 11400 <hr/>
(74) 9796800 9680 <hr/>	(75) 8271496 847 <hr/>	(76) 7009583 936 <hr/>
(77) 9670845 987 <hr/>	(78) 4729800 7500 <hr/>	(79) 8163729 963 <hr/>
(80) 3456789 809 <hr/>	(81) 4680357 1157 <hr/>	(82) 1470695 6312 <hr/>
(83) 5273196 2345 <hr/>	(84) 2800675 6078 <hr/>	(85) 7569826 4953 <hr/>
(86) 8719560 1280 <hr/>	(87) 9374800 6110 <hr/>	(88) 418560 79400 <hr/>
(89) 628593 4006 <hr/>	(90) 237491 5427 <hr/>	(91) 500694 3248 <hr/>

(92) 1369508 2857	(93) 416976 9123	(94) 3748965 7216
(95) 857143 1179	(96) 2581470 6007	(97) 615094 3456
(98) 8278146 1208	(99) 1526374 9876	(100) 864976 7706
(101) 730459 13520	(102) 192639 64087	(103) 580697 52184
(104) 84957 84957	(105) 93756 72648	(106) 76349 79643
(107) 391368 14749	(108) 260489 10809	(109) 292917 34567
(110) 390736 190081	(111) 183697 183697	(112) 497356 24568

(113) How much more or less is 79 times 937 than 86 times 860 ?

(114) In each of 13 boxes there are 175 oranges, and in each of 9 other boxes there are 196 oranges: how many altogether are there in the 22 boxes ?

(115) What number must be added to 476 times 365 to make an amount equal to 365 times 674 ?

(116) If from the sum of  $870 + 975 + 939$  there be taken away the difference of the greatest and least of these numbers, how much will 249 times the remainder amount to ?

(117) How many letters are contained in 381 pages of a book, 39 being the number of lines in a page, and 49 the average number of letters in a line?

**Ex. 6.**

## SIMPLE DIVISION (Short).

(1) 2) <u>54972</u>	(2) 2) <u>113509</u>	(3) 3) <u>581106</u>
(4) 3) <u>16440</u>	(5) 4) <u>209946</u>	(6) 2) <u>761942</u>
(7) 4) <u>86703</u>	(8) 3) <u>203806</u>	(9) 5) <u>175490</u>
(10) 4) <u>35692</u>	(11) 5) <u>312079</u>	(12) 6) <u>581019</u>
(13) 6) <u>88322</u>	(14) 5) <u>651483</u>	(15) 6) <u>348544</u>
(16) 7) <u>34034</u>	(17) 7) <u>121765</u>	(18) 8) <u>221133</u>
(19) 7) <u>90909</u>	(20) 8) <u>308496</u>	(21) 9) <u>907070</u>
(22) 9) <u>41481</u>	(23) 8) <u>512424</u>	(24) 9) <u>343953</u>

Divide separately—

(25) 553842 by 9, 8, 7.	(26) 5084321 by 12, 11, 10.
(27) 459264 by 8, 9, 7.	(28) 6584760 by 11, 12, 10.
(29) 345569 by 9, 7, 8.	(30) 7498909 by 12, 10, 11.
(31) 526947 by 20, 80.	(32) 1746310 by 20, 40, 50.
(33) 579015 by 20, 70.	(34) 3740900 by 20, 60, 80.
(35) 269280 by 40, 90.	(36) 1354827 by 40, 50, 60.
(37) 286110 by 30, 80.	(38) 8765432 by 110, 120.
(39) 193550 by 20, 70.	(40) 9750605 by 100, 900.

(41) The sum of  $89 + 74 + 74 + 94 + 87$  is divided into 11 equal parts: what is the value of each part?

(42) A shilling being worth 12 pence, how many shillings are there in 709040 pence?

(43) A sovereign being worth 20 shillings, how many sovereigns are equivalent to 95371 shillings?

(44) How often can 70 be successively subtracted from a million? and what will at last remain?

(45) How much is 9 times the 8th part of 123456?

(46) Find the amount of 8 times the 9th part of 3456.

(47) How much greater is thrice 367 than the 3rd part of 888?

(48) How much more is 5 times the 4th part of 2720 than 4 times the 5th part of the same number?

### Ex. 7.

#### MISCELLANEOUS EXAMPLES.

(1) Add together the first twelve numbers, 1, 2, 3, 4, &c.

(2) Collect into one sum  $12345 + 67891 + 23456 + 78912 + 34567 + 89123 + 45678 + 91234 + 56789$ .

(3) Add together Six thousand nine hundred and eight, Fifteen thousand six hundred and fifteen, Eight thousand seven hundred and ninety, Eighty-seven thousand and eighteen, Fifty-six thousand seven hundred and sixty-four, Nine thousand and eighty-nine; and from the sum subtract Eighty-four thousand eight hundred and eight.

(4) Find the amount of 57 times the sum of Fifty-six thousand and ninety-four + Sixty-seven thousand three hundred and eighty-four + Forty thousand and twelve + Eighty-eight thousand and seventy-six +

Seventy-five thousand nine hundred and sixty-eight + Nine thousand eight hundred and fifty-seven + Four thousand seven hundred and seventy-six.

(5) From Eighty million eleven thousand and forty-eight subtract Nine hundred and twenty-five thousand and seventy-three, and multiply the remainder by Six thousand and eight.

(6) Two pints make one quart: how many pints of milk are there in 740 quarts? and how many quarts in 740 pints?

(7) Three feet make one yard: how many yards of wire are there in 263 feet? and how many feet in 368 yards?

(8) What number multiplied by 7 will produce Two million sixty-two thousand and sixty?

(9) What number divided by 9 yields a quotient of 6379, with a remainder of 5?

(10) Four baskets contain 23 dozen apples; there are 74 apples in the first basket, 59 in the second, and 65 in the third: how many are in the fourth basket?

(11) Four farthings make one penny: how many farthings are there in 375 pence? and how many pence in 275 farthings?

(12) Twelve pence make one shilling: how many pence are there in 365 shillings? and how many shillings in 365 pence?

(13) Twenty shillings make one pound or sovereign: express the value of 9378 sovereigns in shillings, and also in pence.

(14) How many shillings would pay for 348 dozen pears, if each pear cost a penny?

(15) On one side of a park walk there are 63 flower

plots, and on the other there are 59. If each of the 63 plots contain on an average 4 dozen plants, and each of the 59 plots 5 dozen and 3 plants, how many plants are there in all?

**Ex. 8.**

## SIMPLE DIVISION (Long).

- |                |                 |                 |
|----------------|-----------------|-----------------|
| (1) 23)74658(  | (2) 37)609501(  | (3) 46)211280(  |
| (4) 38)98745(  | (5) 29)149727(  | (6) 41)307828(  |
| (7) 17)69645(  | (8) 13)957918(  | (9) 19)129580(  |
| (10) 47)46013( | (11) 53)100000( | (12) 69)111021( |

- |                    |                     |
|--------------------|---------------------|
| (13) 58105236 ÷ 28 | (14) 338430960 ÷ 36 |
| (15) 72608256 ÷ 14 | (16) 132437550 ÷ 15 |
| (17) 87658765 ÷ 16 | (18) 163270240 ÷ 18 |
| (19) 27421632 ÷ 32 | (20) 356156050 ÷ 49 |
| (21) 23063376 ÷ 48 | (22) 479358328 ÷ 54 |
| (23) 38019106 ÷ 56 | (24) 111111111 ÷ 42 |
| (25) 57160000 ÷ 64 | (26) 427162036 ÷ 63 |
| (27) 60065334 ÷ 77 | (28) 636254190 ÷ 81 |
| (29) 90000000 ÷ 96 | (30) 987654276 ÷ 84 |

Divide separately—

- (31) 37883448258 by 42, 65, 73, 89.
- (32) 18576214500 by 35, 57, 68, 99.
- (33) 25659830410 by 74, 84, 45, 95.
- (34) 61427933452 by 107, 108, 121.
- (35) 17104780800 by 144, 129, 132.
- (36) 50156683677 by 180, 250, 274.
- (37) 98398639099 by 270, 365, 298.
- (38) 17196875640 by 357, 463, 408.
- (39) 76279546431 by 580, 517, 629.

(40) 58589779820 by 470, 690, 789.

(41) 46943908851 by 519, 863, 947.

(42) 39495969798 by 708, 951, 834.

(43) 18192863520 by 1970, 2600.

(44) 50006421000 by 1728, 3450.

(45) 39834778928 by 5432, 6789.

(46) 33918284400 by 7854, 3926.

(47) 82169964000 by 6491, 7533.

(48) 1281496804 by 24600, 35798.

(49) 4619457381 by 53709, 60842.

(50) 2588408431 by 49918, 72653.

(51) The product of two numbers is 53129521; the multiplicand is 7289: what is the multiplier?

(52) What number is contained 999 times exactly in Nine million nine hundred thousand and ninety?

(53) There are 1760 yards in a mile: how many miles are there in Fourteen million four thousand three hundred and twenty yards?

(54) The number 11111 is exactly divisible by 41: by what other number is it so divisible?

(55) If 97 were subtracted successively from 9100 as often as possible, what would be the final remainder?

(56) By what number can One million and one be divided, so that the quotient may be 482 with a remainder of 333?

(57) What are the three smallest numbers, any one of which being added to 123456789 would make the sum exactly divisible by 49?

## Ex. 9.

## REDUCTION OF MONEY.

Reduce—

- (1) to shillings, £36; £209; £850; £175.  
 (2) „ £47 6s.; £58 10s.; £156 15s.; £9 10s.  
 (3) „ £50 12s.; £79 9s.; £80 11s.; £8 19s.  
 (4) to pence, 26s.; 17s.; 15s. 6d.; 36s. 8d.  
 (5) „ 53s. 9d.; 27s. 10d.; 18s. 11d.; 345s. 10½d.  
 (6) „ 57s. 6d.; 81s. 10d.; 63s. 7d.; 599s. 9¼d.  
 (7) to farthings, 7d.; 9d.; 2¾d.; 6¼d.; 9½d.; 125d.  
 (8) „ 11½d.; 10¾d.; 17d.; 13½d.; 8¼d.; 370½d.  
 (9) „ 18d.; 16½d.; 7¾d.; 14¼d.; 3¾d.; 207¾d.  
 (10) to pounds, 80s.; 48s.; 75s.; 39s.; 92s. 9d.  
 (11) „ 230s. 2d.; 1573s. 6d.; 3705s. 8½d.  
 (12) „ 7610s. 11d.; 4171s. 0¾d.; 3018s. 10¼d.  
 (13) to shillings, 2316d.; 5703d.; 4110½d.; 365¼d.  
 (14) „ 1173d.; 727½d.; 5900d.; 1007¾d.  
 (15) „ 7182d.; 2009½d.; 1060d.; 9395¼d.
- |                    | £   | s. | d.   | £   | s. | d.  | £  | s. | d.   |
|--------------------|-----|----|------|-----|----|-----|----|----|------|
| (16) to pence,     | 361 | 14 | 10;  | 295 | 10 | 9½; | 78 | 11 | 11.  |
| (17) „             | 97  | 13 | 4;   | 140 | 7  | 8¼; | 69 | 19 | 2.   |
| (18) „             | 405 | 5  | 11;  | 378 | 0  | 3¾; | 90 | 10 | 6.   |
| (19) to farthings, | 196 | 3  | 7;   | 519 | 14 | 5½; | 81 | 6  | 10½. |
| (20) „             | 78  | 18 | 11¾; | 59  | 12 | 6½; | 77 | 8  | 1¼.  |
| (21) „             | 266 | 15 | 0¾;  | 118 | 11 | 4¼; | 35 | 0  | 10½. |
- 
- |                 | Pence. | Pence.  | Pence.   |
|-----------------|--------|---------|----------|
| (22) to £ s. d. | 13599; | 98374;  | 187326.  |
| (23) „          | 45026; | 55141½; | 66862¼.  |
| (24) „          | 72210; | 150491; | 253528¾. |



	Farth.	Farth.	Farth.
(25) to £ s. d.	35853;	210082;	336386.
(26) „	537480;	112233;	2592955.
(27) „	306287;	544389;	3436388.
(28) to halfpence, 13s. 7d.;	£1 19s. 8½d.;	£5 9s. 0½d.	
(29) „	30s. 10½d.;	£3 11s. 5d.;	£9 2s. 11d.
(30) to pounds, 3917 hf.d.;	1986 hf.d.;	1581 hf.d.	
(31) „	560 guin.;	337 guin.;	75 guin. 5s.
(32) to guineas, £273;	£359;	£36 10s.	
(33) „	5473 hf.d.;	44856 hf.d.;	35284½d.
(34) to pence, 423 farth.;	396 guin.;	721 hf.d.	
(35) „	209 crowns;	590 hf.crs.;	376 florins.

## EX. 10.

## COMPOUND ADDITION (Money).

(1)	(2)	(3)	(4)
£ s. d.	£ s. d.	£ s. d.	£ s. d.
0 16 5½	0 10 9	5 17 10½	4 12 11½
0 8 10¼	0 17 6¼	6 5 6½	7 19 3
0 10 8	0 12 11¼	1 14 10	8 16 5½
0 13 7½	0 16 9	2 10 4½	5 15 7
0 4 11	0 11 2	3 9 1	6 10 10½
0 7 6	0 3 7	4 12 5	9 9 9
(5)	(6)	(7)	
£ s. d.	£ s. d.	£ s. d.	
26 12 10½	64 19 6½	75 10 11½	
16 1 9	57 0 8	18 13 1½	
38 16 7½	38 14 0¼	68 6 2½	
49 13 6¼	9 14 11¼	45 19 11½	
35 8 10	12 14 3	37 0 0½	
27 9 8½	0 17 5½	80 17 11½	

(8)

<i>£</i>	<i>s.</i>	<i>d.</i>
63	13	4
20	15	8 $\frac{3}{4}$
7	15	10
58	4	6 $\frac{1}{4}$
5	17	5
39	6	6

---

(9)

<i>£</i>	<i>s.</i>	<i>d.</i>
70	10	10
77	8	9 $\frac{1}{2}$
83	14	10
91	15	3
76	16	11
88	17	8

---

(10)

<i>£</i>	<i>s.</i>	<i>d.</i>
59	3	4 $\frac{1}{2}$
7	0	6 $\frac{1}{2}$
6	18	9
32	11	0 $\frac{1}{2}$
8	6	8 $\frac{1}{2}$
18	13	3 $\frac{3}{4}$

---

(11)

<i>£</i>	<i>s.</i>	<i>d.</i>
34	14	2 $\frac{1}{2}$
42	3	9
28	6	4 $\frac{3}{4}$
43	12	6
59	13	8 $\frac{1}{2}$
18	10	0
58	4	0 $\frac{3}{4}$

---

(12)

<i>£</i>	<i>s.</i>	<i>d.</i>
96	0	10
8	0	3
27	15	5
72	13	10
4	7	6
4	9	2
3	10	6

---

(13)

<i>£</i>	<i>s.</i>	<i>d.</i>
41	5	11 $\frac{1}{2}$
89	19	8
76	18	10
95	7	8 $\frac{1}{2}$
67	17	11
86	16	4
98	13	10

---

(14)

<i>£</i>	<i>s.</i>	<i>d.</i>
84	13	10
35	6	11 $\frac{3}{4}$
66	7	8 $\frac{1}{2}$
52	15	3 $\frac{1}{2}$
27	19	1 $\frac{3}{4}$
48	4	7 $\frac{1}{2}$
33	10	10 $\frac{3}{4}$

---

(15)

<i>£</i>	<i>s.</i>	<i>d.</i>
96	10	11
68	13	7 $\frac{1}{4}$
98	17	6
87	14	11 $\frac{3}{4}$
69	9	3 $\frac{1}{4}$
11	11	11 $\frac{1}{2}$
85	10	0

---

(16)

<i>£</i>	<i>s.</i>	<i>d.</i>
78	3	5 $\frac{1}{4}$
90	19	6
54	9	6 $\frac{1}{2}$
82	14	7
49	18	8 $\frac{3}{4}$
66	15	0
80	12	6

---

(17)

£	s.	d.
236	3	7
360	13	7
149	4	5
183	11	6
307	19	6
250	10	0
419	10	6

(18)

£	s.	d.
345	6	6½
171	16	10
93	18	6
86	14	11¾
409	8	11¾
50	0	0
158	12	1¼

(19)

£	s.	d.
515	12	2½
773	2	6
891	17	9½
418	9	8½
620	15	0½
380	17	6
420	18	4½

(20)

£	s.	d.
496	0	10¾
445	18	3¾
187	17	11½
303	4	11
692	2	6
588	15	8½
60	9	9
75	11	7

(21)

£	s.	d.
708	14	10¼
93	8	6
97	16	7½
133	2	6
58	13	9½
549	12	3½
75	9	11
304	6	2¼

(22)

£	s.	d.
639	17	0½
702	7	5
398	15	6
185	3	10½
476	3	8½
515	10	7½
630	10	0
209	0	10½

(23)

£	s.	d.
900	14	8
268	8	3
756	13	5
899	17	9
520	12	6
485	9	4
603	7	7
879	5	6
930	11	2

(24)

£	s.	d.
753	18	10½
801	19	9
969	19	8
518	13	11½
694	17	7½
800	0	0
980	15	0
715	12	6
746	6	8½

(25)

£	s.	d.
68	12	8
158	13	4
329	10	10
80	17	6
81	9	5
265	18	10
107	14	10
290	12	6
73	8	10

(26) Find the sum of £690 12s. 6d. + £85 16s. 10½d. + £32 9s. 8½d. + £227 14s. 2½d. + £59 13s. 4½d. + £584 17s. 9¼d. + £76 18s. 11¼d. + £400 10s. 6d. + £188 5s. 7½d.

(27) Add together £418 10s. 1¼d., £84 13s. 3d., £295, £607 4s. 5½d., £365 17s. 6d., £51 10s., £75 10s., £544 18s. 11¼d., £148 6s. 3¼d.

(28) Find the amount of £189 15s. 4d. + £197 18s. 11¼d. + £384 7s. 5¼d. + £208 4s. 10¼d. + £55 13s. 3½d. + £69 8s. 4½d. + £429 14s. 11¼d. + £412 10s. 6¼d. + £360 17s. 8¼d.

(29)

£	s.	d.
527	6	8
237	14	9
463	11	10
817	6	2
324	13	4
678	9	9
185	10	6
194	19	3
504	0	11
630	8	3

(30)

£	s.	d.
725	19	6½
375	6	8
508	13	9¼
99	15	6
75	15	0
83	8	10¾
421	0	11¼
68	19	7½
9	18	5
7	13	4

(31)

£	s.	d.
318	15	11
330	8	6
501	12	0
763	10	10
414	19	8
220	17	6
608	10	0
175	15	0
369	14	9
450	10	6

(32)			(33)			(34)		
£	s.	d.	£	s.	d.	£	s.	d.
694	5	6	710	13	8	987	18	3
785	17	2	833	18	9	578	13	3
870	7	4	621	4	7	727	6	8
868	9	10	906	11	6	465	19	2
300	9	10	325	8	3	599	15	0
456	7	8	357	6	2	606	10	0
590	19	6	841	12	6	376	10	0
247	13	9	478	9	4	889	3	10
940	16	10	639	17	6	275	5	6
256	0	11	680	0	0	468	17	9

(35)			(36)			(37)		
£	s.	d.	£	s.	d.	£	s.	d.
376	14	4	670	3	6	75	16	8
298	8	10	693	12	11	224	2	6
450	13	4	996	19	8	465	2	6
729	6	8	587	15	4	679	18	7
581	7	6	809	17	6	586	9	2
405	9	9	481	15	11	67	3	4
313	10	10	775	10	10	59	7	5
372	17	6	864	14	9	95	6	3
396	5	7	578	16	10	183	14	10
284	12	10	391	8	8	278	16	5
465	4	3	693	7	8	41	10	0

(38)

£	s.	d.
199	14	9
811	16	7
95	7	1
8	8	0
264	12	8
419	5	6
17	17	10
36	9	5
365	11	4
9	6	11
151	13	4
50	12	6

---

(39)

£	s.	d.
591	11	10
947	6	8
978	19	4
899	15	7
966	17	5
789	18	11
606	16	4
978	14	9
489	19	9
597	15	11
644	8	8
868	7	6

---

(40)

£	s.	d.
408	15	0
864	1	10
695	10	8
953	9	9
776	0	6
849	15	10
962	7	6
589	3	7
624	17	4
986	18	1
719	8	3
408	12	10

---

(41)

£	s.	d.
727	8	6
853	12	11
645	19	6
280	13	7
460	19	4
385	7	11
507	6	2
961	12	6
714	4	4
425	8	3
165	15	10

---

(42)

£	s.	d.
394	17	11
935	16	3
807	19	11
465	9	2
793	8	9
865	12	1
684	18	11
493	6	8
368	14	10
580	7	3
743	15	6

---

(43)

£	s.	d.
377	6	9
586	14	7
675	13	6
517	6	3
420	13	4
349	8	8
891	15	6
586	3	10
167	16	4
728	12	10
214	10	10

---

(44)

£	s.	d.
408	13	10
413	15	8
227	16	0
349	17	5
555	11	6
718	18	9
633	8	10
379	8	7
281	10	0
256	15	0
345	9	3
606	0	10

---

(45)

£	s.	d.
315	15	10
946	9	5
678	9	10
460	0	0
284	13	7
819	7	6
362	8	11
775	10	6
566	6	8
501	18	2
938	9	5
874	6	10

---

(46)

£	s.	d.
591	18	3
328	13	10
456	7	8
817	8	6
382	16	10
635	6	6
583	11	10
463	9	5
349	14	9
564	6	1
497	15	10
346	4	6

---

(47)

£	s.	d.
1763	10	10
4062	3	6
2475	18	9
6109	7	5
2836	7	11
1449	12	8
945	9	5
808	0	7
3360	10	0
5786	13	6
569	19	4

---

(48)

£	s.	d.
3065	9	8
6390	14	5
1954	7	4
4321	5	6
2956	19	10
5678	9	10
7017	2	6
3946	14	2
4675	3	7
6896	12	4
4037	16	10

---

(49)

£	s.	d.
1876	13	11
6423	16	9
3609	14	3
2345	16	7
4004	19	10
3818	17	6
4366	17	8
5119	14	10
2644	19	9
2092	15	2
1955	16	6

---

(50)	(51)	(52)
£ s. d.	£ s. d.	£ s. d.
6783 14 11	5146 8 3	3081 15 3
4213 16 3	7050 14 2	6853 19 10
4008 13 6	678 16 9	4131 12 10
7296 15 8	4361 10 2	5656 0 8
5139 17 10	195 9 4	7986 0 10
8752 19 2	6789 3 7	3805 16 9
6973 18 9	3893 1 8	8694 13 7
3647 19 6	48 15 3	9458 14 11
4518 18 4	408 8 6	3009 3 9
7806 11 7	4068 12 9	4567 18 10
2751 12 6	5693 0 4	5681 12 6
2459 16 5	617 5 3	6220 17 6

**Ex. 11.****COMPOUND SUBTRACTION (Money).**

(1)	(2)	(3)	(4)
£ s. d.	£ s. d.	£ s. d.	£ s. d.
0 14 5½	0 18 10½	8 10 9¾	5 6 6
0 5 0½	0 10 2½	3 14 10½	0 12 9
(5)	(6)	(7)	(8)
£ s. d.	£ s. d.	£ s. d.	£ s. d.
6 9 10	9 11 6¾	7 18 8	6 2 0½
1 10 3½	2 15 6½	7 2 8½	3 2 1¾
(9)	(10)	(11)	(12)
£ s. d.	£ s. d.	£ s. d.	£ s. d.
8 8 1¼	3 0 1	9 11 11¼	4 4 0
0 0 10¾	2 0 2¾	0 15 8¼	2 19 7



(13)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 29 \quad 13 \quad 4\frac{1}{4} \\ \underline{9 \quad 15 \quad 2\frac{1}{2}} \end{array}$$

(14)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 40 \quad 10 \quad 2 \\ \underline{10 \quad 10 \quad 6\frac{1}{4}} \end{array}$$

(15)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 31 \quad 12 \quad 10 \\ \underline{12 \quad 1 \quad 11\frac{1}{2}} \end{array}$$

(16)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 56 \quad 8 \quad 3\frac{3}{4} \\ \underline{41 \quad 9 \quad 4\frac{1}{4}} \end{array}$$

(17)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 71 \quad 18 \quad 10\frac{1}{2} \\ \underline{10 \quad 7 \quad 11} \end{array}$$

(18)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 62 \quad 3 \quad 2 \\ \underline{8 \quad 17 \quad 7\frac{3}{4}} \end{array}$$

(19)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 50 \quad 8 \quad 6\frac{1}{4} \\ \underline{29 \quad 6 \quad 3\frac{1}{4}} \end{array}$$

(20)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 36 \quad 14 \quad 0 \\ \underline{18 \quad 6 \quad 11\frac{1}{2}} \end{array}$$

(21)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 73 \quad 5 \quad 10\frac{1}{2} \\ \underline{0 \quad 9 \quad 11\frac{3}{4}} \end{array}$$

(22)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 62 \quad 17 \quad 1\frac{3}{4} \\ \underline{54 \quad 10 \quad 9\frac{1}{2}} \end{array}$$

(23)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 90 \quad 0 \quad 0 \\ \underline{30 \quad 4 \quad 10\frac{1}{4}} \end{array}$$

(24)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 84 \quad 11 \quad 6\frac{1}{2} \\ \underline{8 \quad 17 \quad 0\frac{1}{2}} \end{array}$$

(25)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 41 \quad 1 \quad 3\frac{1}{4} \\ \underline{5 \quad 0 \quad 3\frac{1}{2}} \end{array}$$

(26)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 51 \quad 16 \quad 4 \\ \underline{19 \quad 17 \quad 5\frac{3}{4}} \end{array}$$

(27)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 70 \quad 7 \quad 2 \\ \underline{2 \quad 10 \quad 6} \end{array}$$

(28)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 130 \quad 18 \quad 5\frac{1}{2} \\ \underline{40 \quad 9 \quad 10\frac{1}{4}} \end{array}$$

(29)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 236 \quad 12 \quad 10\frac{3}{4} \\ \underline{159 \quad 19 \quad 11} \end{array}$$

(30)

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 460 \quad 5 \quad 8 \\ \underline{68 \quad 18 \quad 8\frac{1}{2}} \end{array}$$

(31)			(32)			(33)		
£	s.	d.	£	s.	d.	£	s.	d.
313	11	6	365	6	1½	808	18	9½
109	1	10	270	11	6¾	99	10	3
<hr/>			<hr/>			<hr/>		
(34)			(35)			(36)		
£	s.	d.	£	s.	d.	£	s.	d.
501	2	6	625	10	0	717	17	7½
1	19	9¼	330	13	4	19	19	6¾
<hr/>			<hr/>			<hr/>		
£	s.	d.	£	s.	d.	£	s.	d.
(37)	321	10 6	-121	12 6½	-	89	19 5½	
(38)	723	8 7¾	+589	18 3½	-	220	17 6	
(39)	196	16 2¼	+ 55	15 3¾	-	171	18 9½	
(40)	532	9 10	-246	13 6¼	+ 79	13 8¼		
(41)	805	0 5½	-287	19 11¼	-	209	0 10	
(42)	993	14 11	+ 6	10 4	-	600	13 4½	
(43)	270	7 7½	- 64	0 10¾	-	97	15 9¼	
(44)	785	15 4	-498	17 6	+113	17 2		
(45)	601	1 10	- 21	10 0½	+270	9 1¼		

(46) How much greater is £3610 7s. 6d. than the sum of £777 12s. 11d. + £917 17s. 11d.?

(47) What is the difference of the sum of £1354 19s. 4d. + £3709 12s. 5d. and the sum of £6451 11s. 4d. + £657 8s. 9d.?

(48) How much less is £2190 15s. 6d. than the difference between £2540 4s. 3d. and £254 14s. 5d.?

(49) What must be added to the sum of £30720 10s. 6d. and £11011 11s. 11d. to make up £50000?

(50) A sum of money equal to the difference between 1234567 pence and 56789 shillings is deducted from £5050 10s.: what sum remains?

(51) In the six successive days of one week a shopkeeper took £9 17s. 3½d., £12 1s. 6d., £10 9s. 8½d., £15 9s. 10½d., £12 3s. 0½d., and £15 16s. 3½d.: how much did the whole amount come short of £80?

(52) A man goes to market with cash to the amount of 100 guineas. He gives £63 for three bullocks, and £24 15s. for half a score of sheep. He receives £4 7s. 6d., the amount of a bill owing to him, and pays £13 14s. 7d., the amount of two bills owing by him. How much money should he now have upon him?

(53) At the beginning of a week a shopkeeper had cash in hand £175 13s. 6d.; his cash receipts in that week were £8 14s. 2½d., £9 0s. 8½d., £7 5s. 10½d., £8 11s. 9½d., £6 4s., and £11 19s. 1¾d. The cash payments made by him in the same week were £15 10s., £6 18s. 4d., £5 12s. 3d., and £2 11s. 8d. What was his balance of cash in hand at the end of the week?

(54) Harry has 16s. 4½d., Fred has 18s. 9d., and Tom has 19s. 7d.; but Harry owes Fred 5s. 6d., and Tom owes Harry 4s. 8½d. If these debts be now paid, what sum will each person have?

---



# MULTIPLICATION TABLE.

2 times	1 are 2	5 times	9 are 45	9 times	5 are 45
	2 " 4		10 " 50		6 " 54
	3 " 6		11 " 55		7 " 63
	4 " 8		12 " 60		8 " 72
	5 " 10	6 times	1 are 6		9 " 81
	6 " 12		2 " 12		10 " 90
	7 " 14		3 " 18		11 " 99
	8 " 16		4 " 24		12 " 108
	9 " 18		5 " 30	10 times	1 are 10
	10 " 20		6 " 36		2 " 20
	11 " 22		7 " 42		3 " 30
	12 " 24		8 " 48		4 " 40
3 times	1 are 3		9 " 54		5 " 50
	2 " 6		10 " 60		6 " 60
	3 " 9		11 " 66		7 " 70
	4 " 12		12 " 72		8 " 80
	5 " 15	7 times	1 are 7		9 " 90
	6 " 18		2 " 14		10 " 100
	7 " 21		3 " 21		11 " 110
	8 " 24		4 " 28		12 " 120
	9 " 27		5 " 35	11 times	1 are 11
	10 " 30		6 " 42		2 " 22
	11 " 33		7 " 49		3 " 33
	12 " 36		8 " 56		4 " 44
4 times	1 are 4		9 " 63		5 " 55
	2 " 8		10 " 70		6 " 66
	3 " 12		11 " 77		7 " 77
	4 " 16		12 " 84		8 " 88
	5 " 20	8 times	1 are 8		9 " 99
	6 " 24		2 " 16		10 " 110
	7 " 28		3 " 24		11 " 121
	8 " 32		4 " 32		12 " 132
	9 " 36		5 " 40	12 times	1 are 12
	10 " 40		6 " 48		2 " 24
	11 " 44		7 " 56		3 " 36
	12 " 48		8 " 64		4 " 48
5 times	1 are 5		9 " 72		5 " 60
	2 " 10		10 " 80		6 " 72
	3 " 15		11 " 88		7 " 84
	4 " 20		12 " 96		8 " 96
	5 " 25	9 times	1 are 9		9 " 108
	6 " 30		2 " 18		10 " 120
	7 " 35		3 " 27		11 " 132
	8 " 40		4 " 36		12 " 144

## TABLE OF MONEY.

4 farthings	make 1 penny ( <i>d.</i> )
12 pence	„ 1 shilling ( <i>s.</i> )
20 shillings	„ 1 pound (£)

We keep accounts in £, *s.*, *d.*—that is, in pounds, shillings, and pence—expressing farthings as 1 quarter, 1 half, and 3 quarters of a penny; thus, *four pence farthing* is written  $4\frac{1}{4}d.$ , *four pence halfpenny* is written  $4\frac{1}{2}d.$ , *four pence three farthings* is written  $4\frac{3}{4}d.$

We have bronze coins for a penny, a halfpenny, and a farthing, a silver coin for a shilling, and a gold coin, called a sovereign, for a pound.

We have also the following values represented by coins:—

3 pence	make 1 threepenny piece.
4 pence	„ 1 fourpenny piece.
6 pence	„ 1 sixpenny piece.
2 shillings	„ 1 florin.
2 shillings and 6 pence	„ 1 half-crown.
5 shillings	„ 1 crown.
10 shillings	„ 1 half-sovereign.

A guinea and a half-guinea are names of coins not now in circulation, their values being 21*s.* and 10*s.* 6*d.* respectively.







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# HUNTER'S STANDARD ARITHMETIC

A GRADUATED SCHEME OF ARITHMETICAL EXAMPLES

ADAPTED TO THE REGULATIONS OF  
THE NEW CODE

BY THE  
REV. JOHN HUNTER, M.A.

AUTHOR OF 'A STANDARD ALGEBRA'

PART II.  
(STANDARDS IV. & V.)

LONDON  
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1878

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*Price Twopence*



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## ADVERTISEMENT.

IN this ARITHMETICAL MANUAL, which is adapted for School Board, National, and other Elementary Schools, the special work of successive Standards is as follows :

### *PART I.*

Standard I. includes Exercises 1-3.

„ II. „ „ 4-7.

„ III. „ „ 8-11.

### *PART II.*

Standard IV. includes Exercises 12-17.

„ V. „ „ 18-20.

### *PART III.*

Standard VI. includes Exercises 21-50.

## STANDARD ARITHMETIC.

## PART II.

## Ex. 12.

## COMPOUND MULTIPLICATION (Money).

Multiply—

£	s.	d.		£	s.	d.	
(1)	0	12	$7\frac{1}{4}$ by 2, 5.	(2)	0	15	$10\frac{3}{4}$ by 3, 5.
(3)	0	9	$10\frac{1}{4}$ by 3, 7.	(4)	0	19	$3\frac{1}{2}$ by 4, 7.
(5)	1	8	$6\frac{3}{4}$ by 2, 9.	(6)	1	16	$6\frac{1}{4}$ by 4, 9.
(7)	2	13	$11\frac{1}{2}$ by 3, 8.	(8)	2	6	$8\frac{1}{4}$ by 5, 8.
(9)	4	10	$9\frac{3}{4}$ by 4, 9.	(10)	3	7	$3\frac{1}{2}$ by 6, 9.
(11)	7	19	$10\frac{3}{4}$ by 5, 7.	(12)	5	5	$4\frac{3}{4}$ by 6, 8.
(13)	6	14	$5\frac{1}{4}$ by 4, 6.	(14)	8	11	$10\frac{1}{4}$ by 7, 9.
(15)	9	18	$0\frac{1}{2}$ by 5, 9.	(16)	10	12	$11\frac{3}{4}$ by 5, 11.
(17)	15	9	$8\frac{3}{4}$ by 10, 12.	(18)	37	4	$10\frac{1}{2}$ by 8, 11.
(19)	66	17	$4\frac{1}{2}$ by 3, 10.	(20)	50	19	2 by 6, 11.
(21)	49	8	$7\frac{1}{2}$ by 7, 12.	(22)	71	10	$0\frac{1}{4}$ by 8, 12.
(23)	67	13	$11\frac{1}{4}$ by 16, 21.	(24)	86	12	$9\frac{1}{2}$ by 15, 28.
(25)	43	2	8 by 18, 25.	(26)	19	16	$0\frac{3}{4}$ by 20, 27.
(27)	28	11	5 by 22, 30.	(28)	47	5	10 by 24, 35.
(29)	72	1	$6\frac{1}{2}$ by 32, 42.	(30)	53	18	3 by 33, 40.
(31)	18	17	11 by 36, 49.	(32)	60	15	$5\frac{1}{4}$ by 45, 56.
(33)	35	12	10 by 54, 64.	(34)	49	10	$4\frac{3}{4}$ by 48, 63.
(35)	27	14	8 by 55, 72.	(36)	80	6	$1\frac{1}{2}$ by 84, 99.

$\pounds$	$s.$	$d.$		$\pounds$	$s.$	$d.$	
(37)	275	14	$7\frac{1}{2} \times 13.$	(38)	368	11	$3\frac{3}{4} \times 17.$
(39)	86	19	$5 \times 19.$	(40)	184	8	$10 \times 23.$
(41)	94	3	$11\frac{1}{4} \times 34.$	(42)	70	19	$7 \times 38.$
(43)	509	0	$4\frac{1}{2} \times 47.$	(44)	218	6	$2 \times 53.$
(45)	127	5	$9 \times 68.$	(46)	479	12	$6\frac{1}{2} \times 76.$
(47)	338	17	$8\frac{3}{4} \times 83.$	(48)	62	10	$1\frac{1}{4} \times 29.$
(49)	9	15	$10 \times 87.$	(50)	517	13	$8\frac{1}{2} \times 94.$
(51)	56	4	$11\frac{1}{2} \times 109.$	(52)	84	14	$0\frac{3}{4} \times 127.$
(53)	460	11	$7 \times 138.$	(54)	197	16	$8 \times 149.$
(55)	8	17	$6 \times 157.$	(56)	28	7	$5 \times 169.$
(57)	47	8	$10\frac{1}{4} \times 165.$	(58)	9	15	$1\frac{1}{2} \times 194.$
(59)	176	13	$4 \times 177.$	(60)	216	0	$11 \times 163.$
(61)	97	14	$3 \times 256.$	(62)	350	18	$0\frac{1}{2} \times 271.$
(63)	18	12	$2\frac{1}{2} \times 319.$	(64)	58	3	$7\frac{1}{4} \times 307.$
(65)	603	6	$10 \times 377.$	(66)	12	10	$6 \times 365.$
(67)	349	19	$8 \times 470.$	(68)	472	8	$9 \times 593.$
(69)	78	5	$4\frac{1}{2} \times 609.$	(70)	61	11	$3\frac{3}{4} \times 1721.$
(71)	183	13	$5 \times 995.$	(72)	246	4	$10 \times 1806.$
(73)	227	1	$0\frac{3}{4} \times 962.$	(74)	316	14	$6 \times 3790.$

**Ex. 13.****GREATEST COMMON MEASURE.**

Find the G. C. M. of—

- |      |                |      |                  |
|------|----------------|------|------------------|
| (1)  | 48 and 126.    | (2)  | 252 and 945.     |
| (3)  | 264 and 418.   | (4)  | 1561 and 721.    |
| (5)  | 1323 and 2499. | (6)  | 478 and 1093.    |
| (7)  | 4117 and 9223. | (8)  | 649 and 11741.   |
| (9)  | 2747 and 1943. | (10) | 46013 and 11303. |
| (11) | 3519 and 6069. | (12) | 128537 and 7123  |

Reduce to simplest terms—

- |                                 |                                 |                                 |                                   |
|---------------------------------|---------------------------------|---------------------------------|-----------------------------------|
| (13) $\frac{75}{130}$           | (14) $\frac{176}{253}$          | (15) $\frac{286}{494}$          | (16) $\frac{273}{728}$            |
| (17) $\frac{279}{589}$          | (18) $\frac{561}{935}$          | (19) $\frac{434}{656}$          | (20) $\frac{296}{319}$            |
| (21) $\frac{1421}{1827}$        | (22) $\frac{777}{2257}$         | (23) $\frac{1547}{3367}$        | (24) $\frac{2345}{6901}$          |
| (25) $\frac{3151}{5617}$        | (26) $\frac{2703}{7473}$        | (27) $\frac{1234}{2609}$        | (28) $\frac{10010}{54054}$        |
| (29) $\frac{10282}{18818}$      | (30) $\frac{11537}{127405}$     | (31) $\frac{299667}{2969967}$   | (32) $\frac{24747}{160799}$       |
| (33) $\frac{31\frac{1}{2}}{42}$ | (34) $\frac{7\frac{1}{2}}{30}$  | (35) $\frac{35\frac{1}{2}}{36}$ | (36) $\frac{29\frac{3}{4}}{51}$   |
| (37) $\frac{19\frac{1}{4}}{26}$ | (38) $\frac{15\frac{3}{4}}{72}$ | (39) $\frac{43\frac{1}{2}}{54}$ | (40) $\frac{232\frac{1}{2}}{589}$ |

**Ex. 14.**

## SUPPLEMENT TO SIMPLE DIVISION.

[\*,\* In working the following Examples, the remainder, as a fraction of the divisor, in simplest terms, should be written on the right of the quotient.]

Divide—

- |                          |                           |
|--------------------------|---------------------------|
| (1) 680186 by 4, 6, 9.   | (2) 2635594 by 6, 8, 10.  |
| (3) 544668 by 9, 10, 11. | (4) 5803270 by 8, 12, 20. |
| (5) 823749 by 30, 27.    | (6) 9887112 by 42, 54.    |
| (7) 857325 by 28, 45.    | (8) 1502199 by 46, 51.    |
| (9) 755937 by 52, 49.    | (10) 6524681 by 87, 92.   |
| (11) 711464 by 403.      | (12) 2890799 by 357.      |
| (13) 856144 by 365.      | (14) 2500100 by 529.      |
| (15) 938214 by 893.      | (16) 2717800 by 4387.     |

- (17) 904975 by 2067.      (18) 1636475 by 4489.  
 (19) 838629 by 28762,      (20) 8580131 by 46070.  
 (21)  $52798\frac{1}{2}$  by 4, 6, 9.      (22)  $270611\frac{1}{2}$  by 6, 8, 10.  
 (23)  $12960\frac{3}{4}$  by 27, 55.      (24)  $741522\frac{1}{2}$  by 323.

**Ex. 15.****COMPOUND DIVISION (Money).**

Divide—

- |      | £   | s. | d.                         |      | £   | s. | d.                        |
|------|-----|----|----------------------------|------|-----|----|---------------------------|
| (1)  | 0   | 17 | $8\frac{1}{2}$ by 2, 5.    | (2)  | 0   | 17 | $2\frac{1}{4}$ by 3, 5.   |
| (3)  | 0   | 19 | 3 by 3, 7.                 | (4)  | 5   | 17 | 3 by 4, 7.                |
| (5)  | 6   | 17 | 3 by 2, 9.                 | (6)  | 7   | 5  | 6 by 4, 9.                |
| (7)  | 9   | 13 | 0 by 3, 8.                 | (8)  | 9   | 14 | 2 by 5, 8.                |
| (9)  | 17  | 9  | 10 by 4, 9.                | (10) | 16  | 12 | 9 by 6, 9.                |
| (11) | 19  | 14 | $5\frac{3}{4}$ by 5, 7.    | (12) | 19  | 8  | 2 by 6, 8.                |
| (13) | 23  | 18 | $10\frac{1}{2}$ by 4, 6.   | (14) | 28  | 12 | $6\frac{1}{2}$ by 7, 9.   |
| (15) | 33  | 12 | $5\frac{1}{4}$ by 5, 9.    | (16) | 35  | 17 | $6\frac{3}{4}$ by 5, 11.  |
| (17) | 56  | 7  | $2\frac{1}{4}$ by 10, 12.  | (18) | 78  | 10 | $5\frac{3}{4}$ by 8, 11.  |
| (19) | 67  | 5  | $11\frac{1}{4}$ by 3, 10.  | (20) | 59  | 7  | 5 by 6, 11.               |
| (21) | 75  | 13 | $4\frac{1}{2}$ by 7, 12.   | (22) | 61  | 6  | $10\frac{1}{2}$ by 8, 12. |
| (23) | 176 | 0  | 10 by 14, 25.              | (24) | 134 | 10 | $7\frac{1}{2}$ by 49, 54. |
| (25) | 119 | 11 | $1\frac{1}{2}$ by 55, 72.  | (26) | 242 | 10 | 4 by 27, 64.              |
| (27) | 309 | 2  | $8\frac{1}{4}$ by 33, 45.  | (28) | 681 | 16 | 7 by 32, 42.              |
| (29) | 470 | 17 | 0 by 48, 63.               | (30) | 645 | 0  | 6 by 60, 81.              |
| (31) | 531 | 0  | $0\frac{1}{2}$ by 28, 66.  | (32) | 865 | 1  | $4\frac{1}{2}$ by 84, 99. |
| (33) | 221 | 8  | $11\frac{1}{4}$ by 23, 26. | (34) | 474 | 1  | 9 by 19, 34.              |
| (35) | 362 | 7  | $8\frac{1}{2}$ by 38, 85.  | (36) | 876 | 8  | $7\frac{3}{4}$ by 29, 53. |
| (37) | 365 | 19 | $9\frac{1}{4}$ by 59, 73.  | (38) | 921 | 0  | $9\frac{1}{4}$ by 67, 83. |
| (39) | 509 | 6  | $10\frac{1}{4}$ by 87, 78. | (40) | 700 | 0  | 0 by 69, 76.              |



	£	s.	d.	
(41) Divide	2696	10	0 $\frac{1}{4}$	by 109, 127.
(42) „	3607	5	11 $\frac{1}{4}$	by 295, 377.
(43) „	9177	9	4 $\frac{1}{2}$	by 365, 298.
(44) „	4923	1	2	by 589, 289.
(45) „	3043	16	2 $\frac{1}{2}$	by 457, 713.
(46) „	5296	11	3 $\frac{3}{4}$	by 657, 949.
(47) „	5918	19	11	by 547, 901.
(48) „	13164	16	7	by 1354, 1795.
(49) „	29864	4	0 $\frac{1}{2}$	by 2773, 2928.
(50) „	53216	2	6 $\frac{3}{4}$	by 6794, 8342.

	£	s.	d.		£	s.	d.
(51) How often is	0	12	10 $\frac{1}{2}$	contained in	10	18	10 $\frac{1}{2}$ P
(52) „	0	16	0 $\frac{3}{4}$	„	19	5	6 P
(53) „	0	19	11 $\frac{1}{4}$	„	17	18	10 $\frac{1}{2}$ P
(54) „	0	6	8 $\frac{1}{2}$	„	11	8	1 P
(55) „	0	9	7	„	17	5	0 P
(56) „	1	14	0 $\frac{1}{4}$	„	96	19	2 $\frac{1}{4}$ P
(57) „	3	18	9	„	220	10	0 P
(58) „	2	0	10 $\frac{3}{4}$	„	126	15	6 $\frac{1}{2}$ P
(59) „	3	15	8	„	279	19	4 P
(60) „	4	11	9	„	266	1	6 P
(61) „	6	8	7 $\frac{1}{2}$	„	482	6	10 $\frac{1}{2}$ P
(62) „	0	18	4 $\frac{1}{2}$	„	143	6	6 P
(63) „	5	5	10 $\frac{1}{2}$	„	518	15	9 P
(64) „	17	7	6	„	486	10	0 P
(65) „	9	12	7	„	129	19	10 $\frac{1}{2}$ P
(66) „	3	13	11	„	95	3	4 $\frac{1}{4}$ P
(67) „	26	16	10 $\frac{1}{2}$	„	1009	6	6 P
(68) „	15	9	3 $\frac{3}{4}$	„	1694	11	9 $\frac{3}{4}$ P
(69) „	0	17	9 $\frac{1}{4}$	„	256	1	8 $\frac{1}{4}$ P

		£	s.	d.		£	s.	d.
(70)	How often is 47 12 0 contained in 4558 8 0 ?							
(71)	„ 35 0 0 $\frac{3}{4}$ „ 3074 3 9 ?							
(72)	„ 8 14 1 $\frac{1}{4}$ „ 925 0 8 $\frac{1}{2}$ ?							

(73) How many copies of a book which costs 3s. 1 $\frac{1}{2}$ d. can be got for £3 11s. 10 $\frac{1}{2}$ d. ?

(74) The whole amount of wages paid equally to 37 workmen was £65 13s. 6d. : how much did each man receive ?

(75) By what sum does the 53rd part of £870 14s. 11d. exceed the 59th part of £943 10s. 2d. ?

(76) How often is 54 times 20s. 6d. contained in 180 times 15s. 4 $\frac{1}{2}$ d. ?

(77) Add together £2 13s. 8 $\frac{3}{4}$ d., £5 16s. 6 $\frac{1}{2}$ d., and £9 8s. 10 $\frac{1}{4}$ d.; then multiply the sum by 93, and divide the product by £5 9s. 1 $\frac{3}{4}$ d.

(78) How often could £23 13s. 5 $\frac{1}{2}$ d. be paid away out of £1013 17s. 9d. ? and what would be the value of the final remainder expressed in half-crowns ?

(79) If 34 gallons of spirits worth 13s. 10d. a gallon be mingled with 26 worth 16s. 4d. a gallon, what will a gallon of the mixture be worth ?

(80) Divide the sum of £68 16s. and £27 19s. 10 $\frac{3}{4}$ d. by their difference.

### Ex. 16.

#### REDUCTION, ETC. OF COMMON WEIGHTS AND MEASURES.

##### *Avoirdupois Weight.*

Reduce—

- (1) to lb., 6 cwt.; 19 cwt.; 47 cwt.; 23 $\frac{1}{4}$  cwt.;  
18 $\frac{1}{2}$  cwt.

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- (2) to lb.,  $25\frac{3}{4}$  cwt.; 15 cwt. 2 qrs.; 107 cwt. 3 qrs.
- (3) „ 4 cwt. 1 qr. 17 lb.; 9 cwt. 3 qrs. 20 lb.; 13 cwt. 27 lb.
- (4) „ 26 cwt. 2 qrs. 19 lb.; 5 t. 17 cwt. 3 qrs. 7 lb.
- (5) „ 13 t. 13 cwt. 13 lb.; 25 t. 2 cwt. 1 qr.  $18\frac{1}{2}$  lb.
- (6) to oz., 15 lb.; 23 lb.; 17 lb. 6 oz.; 22 lb. 9 oz.; 57 lb. 15 oz.
- (7) „ 29 lb.  $10\frac{1}{2}$  oz.; 6 cwt. 1 qr. 23 lb.; 5 cwt. 12 lb. 14 oz.
- (8) „ 4 t. 19 cwt. 21 lb. 11 oz.; 16 t. 3 qrs.  $7\frac{1}{4}$  oz.
- (9) to cwt., 13 t. 15 cwt.; 219 t. 17 cwt.; 187 qrs.; 2783 lb.
- (10) „ 4096 lb.; 1218 lb.; 8539 lb.; 4567 oz.; 2187 oz.
- (11) to tons, 175 cwt.; 477 cwt.; 19410 lb.; 208190 oz.
- (12) „ 350 qrs.; 45696 oz.; 45678 lb.; 7572 half-lbs.
- (13) Find the sum of 24 cwt. 3 qrs. 18 lb. + 9 cwt. 19 lb. + 15 cwt. 2 qrs. 11 lb. + 1 cwt. 3 qrs. 5 lb.
- (14) Find the sum of 3 t. 14 cwt. 1 qr. 19 lb. + 7 cwt. 3 qrs. 13 oz. + 2 t. 19 cwt. 2 qrs. 10 lb. 6 oz. + 6 t. 16 cwt. 21 lb. 12 oz.
- (15) From 103 cwt. 2 qrs. 14 lb. subtract 4 cwt. 2 qrs. 17 lb.
- (16) From 31 cwt. 10 lb. subtract 20 cwt. 1 qr. 15 lb.
- (17) Multiply 19 cwt. 1 qr. 4 lb. 15 oz. by 17.
- (18) Multiply 2 t. 17 cwt. 17 lb. by 23.

(19) Divide 385 cwt. 3 qrs. 8 lb. by 39.

(20) Divide 50 t. 14 cwt. 1 qr. 26 lb. by 17 cwt. 1 qr. 27 lb.

### *Troy Weight.*

Reduce—

(21) to oz., 7 lb.; 15 lb.;  $9\frac{1}{2}$  lb.;  $10\frac{1}{2}$  lb.;  $15\frac{3}{4}$  lb.

(22) „ 13 lb. 5 oz.; 7 lb. 8 oz.; 11 lb. 10 oz.;  
16 lb.  $7\frac{1}{2}$  oz.

(23) to dwt., 8 lb.; 6 lb. 11 oz.; 17 lb. 4 oz. 13 dwt.

(24) to grs., 12 lb.; 10 lb. 10 oz.; 14 lb. 3 oz.  
19 dwt. 15 grs.

(25) to dwt., 371 grs.;  $19\frac{1}{2}$  oz.; 1690 grs.; 1200 grs.

(26) to oz., 1317 dwt.; 750 dwt.; 4270 grs.;  
 $73\frac{1}{2}$  dwt.

(27) to lbs., 55570 grs.; 6060 grs.;  $4171\frac{1}{2}$  dwt.

(28) Find the sum of 1 lb. 8 oz. 18 dwt. + 10 oz.  
15 dwt. 12 grs. + 7 oz. 3 dwt. + 2 lb. 3 oz. 16 dwt. 22 grs.

(29) How much greater is 2 lb. 10 dwt. than 1 lb.  
2 oz. 15 dwt. 13 grs.

(30) Multiply 7 oz. 14 dwt. 19 grs. by 41.

(31) Divide 83 lb. 9 oz. 2 dwt. by 57.

(32) How often is 11 oz. 11 dwt. 14 grs. contained  
in 34 lb. 8 oz. 17 dwt. ?

### *Linear Measure.*

Reduce—

(33) to yards, 59 mi.; 23 fur.; 27 mi. 5 fur.;  
386 ft.

(34) „ 19 mi. 1 fur. 107 yds.; 2381 ft.;  
17083 in.

(35) to inches, 28 mi.; 53 fur.; 136 yds.; 47 yds.  
2 ft.

- (36) to inches, 71 yds. 1 ft. 10 in.; 18 ft. 9 in.;  
163 yds. 11 in.
- (37) to feet, 236508 in.; 1760 yds.; 5 fur. 96 yds.  
1 ft.
- (38) ,, 37198 in.; 230 mi.; 18 mi. 3 fur.  
196 yds.
- (39) to miles, 9680 yds.; 939 fur.; 7039 yds.;  
8078 ft.
- (40) Add together 135 yds. 2 ft. 11 in., 278 yds.  
10 in., and 89 yds. 2 ft. 6 in.
- (41) Subtract 28 yds. 2 ft. 9 in. from 208 yds. 1 ft.  
5 in.
- (42) Multiply 23 yds. 1 ft. 8 in. by 365.
- (43) Divide 63 yds. 7 in. by 26.
- (44) Divide 5 mi. 2 fur. 95 yds. 1 ft. by 7 fur.  
179 yds. 2 ft.

*Square Measure.*

Reduce—

- (45) to sq. ft., 58 sq. yds.; 64 sq. yds. 7 ft.;  
23095 sq. in.
- (46) to sq. yds., 2094 sq. ft.; 10368 sq. in.; 17980  
sq. in.
- (47) to sq. in., 47 sq. ft.; 12 sq. yds. 3 ft. 103 in.;  
7 sq. ft. 79 in.
- (48) to sq. po.,  $39\frac{1}{2}$  ac.; 15 ac. 2 ro. 22 po.; 3 ro.  
 $13\frac{1}{2}$  po.
- (49) ,, 217 ac. 1 ro. 27 po.; 19 ac. 32 po.;  
 $117\frac{3}{4}$  ac.
- (50) to acres, 2357 po.; 4280 po.; 1428 ro.;  
11535 po.
- (51) Add together 28 ac. 2 ro. 13 po., 156 ac. 1 ro.  
21 po., and 79 ac. 3 ro. 38 po.

(52) How much larger is a piece of land containing  $3\frac{1}{4}$  acres, than another piece containing 309 sq. poles?

(53) Multiply 48 ac. 3 ro. 16 po. by 84.

(54) Divide 1677 ac. 2 ro. 17 po. by 47.

### *Cubic Measure.*

Reduce—

(55) to cub. in., 78 cub. ft.; 98 cub. yds.; 9 cub. yds. 21 ft. 150 in.

(56) to cub. ft., 58752 cub. in.; 8 cub. yds. 20 ft.; 33851 cub. in.

(57) to cub. yds., 729 cub. ft.; 1009 cub. ft.; 184000 cub. in.

### *Liquid Measure.*

Reduce—

(58) to pints, 47 qts.; 376 gall.;  $37\frac{1}{2}$  gall.; 5 gall. 3 qts. 1 pt.

(59) „ 127 $\frac{3}{4}$  qts.; 7 gall.  $2\frac{1}{2}$  qts.; 35 gall. 1 qt.  $1\frac{1}{4}$  pt.

(60) to quarts, 5379 pts.; 157 half-gall.; 53 gall. 2 qts. 1 pt.

(61) to gall., 187 qts.; 399 pts.;  $673\frac{1}{2}$  pts.; 619 half-pts.

### *Dry Measure.*

Reduce—

(62) to pks., 77 gall.; 193 bu.;  $63\frac{1}{4}$  bu.; 17 qu.  $5\frac{1}{2}$  bu.

(63) to bu., 139 gall.; 239 pks.; 27 qu. 6 bu.;  $33\frac{1}{2}$  qu.

- (64) to gall, 57 bu. ; 27 pks. 1 gall. ; 16 bu. 2 pks.  
1 gall.  
(65) to qu., 419 bu. ; 1008 pks. ; 1697 pks. ; 357  
half-pks.

*Time.*

Reduce—

- (66) to days, 169 com. yrs. ; 53 com. yrs. 153 da. ;  
1000 hrs.  
(67) ,, 97 wks. 5 da. ; 3496 min. ; 1234567  
sec.  
(68) to wks., 903 da. ; 3497 hrs. ; 858 hrs. ; 18450  
min.  
(69) to hrs., 365 da. ; 6 hrs. ; 136 wks. 5 da. ;  
9 wks. 19 hrs.  
(70) ,, 68749 min. ; 249 da. 30 min. ; 64900  
sec.  
(71) to min., 313 da. ; 397350 sec. ; 29 da. 9 hrs.  
59 min.  
(72) to sec., 23 hrs. 16 min. ; 365 da. 5 hrs. 48 min.  
48 sec.

**Ex. 17.**

## MISCELLANEOUS EXAMPLES.

(1) A fishing boat lands 2701 pairs of soles, packed in 74 boxes : what is the average number of soles in each box ?

(2) The several amounts charged in an invoice for four parcels of goods were £51 6s. 10d., £49 8s. 7d., £19 14s., and £18 17s. 6d. ; but a deduction of £5 11s. 5d.

from the whole amount was allowed on account of present payment. What was the net sum paid?

(3) A merchant's cash account for one month contains on the left hand side the following entries of cash in hand and received: £2250 2s. 10d., £78 15s., £129 10s. 6d., £4 16s. 10d., £205 7s. 2d., £267 3s. 4d., £86 12s. 6d., £340 17s. 10d., £310, £63 14s. 6d., £7 18s. 9d. It contains on the right hand side the following entries of cash paid and remaining in hand: £46 11s. 6d., £150 10s., £247 9s. 8d., £308 13s. 10d., £356, £2 10s. 9d., £183 8s. 4d., £5 13s. 4d., £217 4s. 11d., £2226 16s. 11d. Find the amount of each side.

(4) How much greater is the amount of 17 yards of silk at 4s.  $10\frac{1}{2}$ d. per yard, than that of 18 yards of silk at 5s.  $1\frac{1}{2}$ d. per yard?

(5) Find the total amount of 14 lb. of beef at  $10\frac{1}{2}$ d. per lb., 9 lb. of mutton at  $11\frac{1}{2}$ d., and 9 lb. of veal at 10d.

(6) What is the joint amount of 43 half-guineas and 43 half-crowns?

(7) Two five-pound notes were put down to pay for 21 yards of silk at 4s.  $11\frac{1}{2}$ d. per yard, 13 yards lining at  $5\frac{3}{4}$ d., 14 yards ribbon velvet at 1s. 4d., 18 yards calico at  $10\frac{3}{4}$ d., 15 yards blind holland at  $9\frac{3}{4}$ d., and 15 yards flannel at 2s.  $2\frac{1}{2}$ d. What change was to be returned?

(8) How much money altogether is required to pay the wages of 27 men for 23 days at 4s. 7d. a day for each man, 19 men for 11 days at 5s. 6d., and 16 men for 12 days at 5s. 9d.?

(9) A sum of money consists of 5 half-sovereigns, 7 half-crowns, and 15 sixpences: how many yards of cotton print will it buy, at  $7\frac{1}{2}$ d. a yard?

(10) How much greater would be the result of



multiplying 6 yds. 2 ft. 8 in. by 78, than that of multiplying it by 57?

(11) How many dozen lb. of coffee, at 1s. 5½d. a lb., would amount to 2½ guineas?

(12) How many workmen, earning 4s. 9d. each per day, would £433 18s. 8d. pay for 63 days?

(13) A, B, C, have each a sum of money. A's money expressed in farthings is 3160; B's expressed in half-crowns is 34, and C's expressed in sixpences is 199. If A give B 30 shillings, and B give C 17 shillings, and C give A a guinea, what will each person then have?

(14) How many more inches are there in 156 yds. 2 ft. than in 67 yds. 2 ft. 7 in.?

(15) Find, by direct reduction, how often 1½d. is contained in each of the following sums: £3 12s. 10½d., 16s. 7½d., £1 19s. 4½d., £12 8s. 9d.

(16) A mechanic has laid by £29 16s. 6d.: how many weeks must he work that, by laying by 3s. 10d. a week out of his earnings, the whole amount of his savings may be raised to £35?

(17) Four casks of sugar weigh respectively 2 cwt. 3 qrs. 18 lbs., 2 cwt. 1 qr. 16 lb., 2 cwt. 26 lb., and 2 cwt. 1 qr. 10 lb.: what is the average weight per cask?

(18) The daily amounts of cash taken by a shop-keeper last week were £2 15s. 7½d., £2 19s. 6d., £3 18s. 10½d., £4 3s. 5½d., £3 10s. 2½d., and £5 17s. 4½d. Find his average daily receipt.

(19) How many quarters of wheat at 57s. 9d. a quarter amount to the value of 84 quarters at 53s. 2d.?

(20) The value of £40 10s. is made up of a certain number of sovereigns, together with the same number

of half-crown pieces : how many coins are there of each sort ?

(21) Divide half-a-guinea between Frank and Tom, so that Frank may have thrice as much as Tom.

(22) A cwt. of rice is carried in three loads by a man, his wife, and their son, the man carrying twice as great a load as the son, and the son twice as great a load as the wife. How many lb. are carried by each ?

(23) Divide 42 yards of silk into two lengths, one of which shall exceed the other by 3 yards.

(24) The sum of 8s. 9d. is to be divided between A and B, so that A may have 18 pence less than B : what will each receive ?

(25) Three labourers, A, B, C, dug out 520 cubic yards of clay ; A dug one-third as much as B, and B one-third as much as C. How many cubic yards did each dig out ?

(26) Divide £3 3s. 3½d. among A, B, C, so that A may have 3½d. more than B, and B 3½d. more than C.

(27) A sovereign is so divided among James, Walter, and Harry, that James gets half-a-crown more than Walter, and Walter two shillings less than Harry : what sum is given to each ?

(28) Dick, Fred, and Harry have among them 7s. 4d. Dick has 10½d. more than Fred, and Fred has 8½d. less than Harry : what sum has each ?

(29) If five balls of string each contain 45 yards, how must the string be divided among four boys, that the first boy may have 28 inches more than the second, the second 32 inches more than the third, and the fourth 3 yards less than the first ?

(30) Tom's money is 7 times as much as Harry's

through Harry having 7 shillings less than Tom : what sum has each ?

**Ex. 18.****PRACTICE.\***

Things	£	s.	d.	Things	£	s.	d.
(1) 159 at	0	10	0	(2) 237 at	0	4	0
(3) 366 „	0	5	0	(4) 290 „	0	10	0
(5) 315 „	0	2	6	(6) 196 „	0	6	8
(7) 638 „	0	4	0	(8) 241 „	0	5	0
(9) 387 „	0	3	4	(10) 824 „	0	6	8
(11) 501 „	0	2	6	(12) 254 „	0	2	0
(13) 709 „	0	2	0	(14) 269 „	0	3	4
(15) 663 „	0	1	8	(16) 238 „	0	1	8
(17) 417 „	1	10	0	(18) 434 „	1	4	0
(19) 455 „	2	2	6	(20) 207 „	3	6	8
(21) 235 „	1	1	8	(22) 271 „	5	5	0
(23) 322 „	1	3	4	(24) 746 „	4	2	0
(25) 187 „	0	6	0	(26) 356 „	0	7	6
(27) 365 „	0	12	0	(28) 290 „	0	12	6
(29) 414 „	0	15	0	(30) 187 „	0	13	4
(31) 680 „	0	11	8	(32) 406 „	0	11	3
(33) 918 „	0	5	4	(34) 365 „	0	6	3
(35) 274 „	0	11	0	(36) 281 „	0	8	0
(37) 572 „	0	8	4	(38) 985 „	0	9	0
(39) 179 „	0	14	0	(40) 942 „	0	16	8

\* Examples in what is called *Compound Practice* are in general more conveniently worked by the method of Simple Proportion.

	Things	£	s.	d.		Things	£	s.	d.
(41)	365 at	1	13	4	(42)	93 at	3	10	10
(43)	86 „	1	4	6	(44)	437 „	2	5	10
(45)	1728 „	1	5	5	(46)	273 „	5	12	6
(47)	74 „	2	10	8	(48)	2019 „	3	15	0
(49)	710 „	2	8	0	(50)	675 „	1	4	8
(51)	1350 „	4	8	8	(52)	1875 „	7	7	0
(53)	337 „	1	7	8	(54)	389 „	1	10	6
(55)	586 „	6	12	0	(56)	177 „	3	7	6
(57)	1038 „	4	2	1	(58)	641 „	1	3	8
(59)	95 „	3	3	9	(60)	276 „	5	2	11
(61)	86 „	0	2	5	(62)	682 „	0	3	7
(63)	283 „	0	5	9	(64)	76 „	0	6	11
(65)	4670 „	0	9	4	(66)	653 „	0	10	11
(67)	1539 „	0	7	10	(68)	471 „	0	6	5
(69)	825 „	0	8	6	(70)	713 „	0	8	9
(71)	1578 „	0	13	8	(72)	2345 „	0	12	1
(73)	943 „	1	11	9	(74)	278 „	1	17	6
(75)	98 „	4	17	4	(76)	1645 „	3	14	10
(77)	519 „	3	13	6	(78)	297 „	4	17	8
(79)	158 „	2	14	2	(80)	443 „	3	19	0
(81)	365 „	0	1	10½	(82)	3670 „	0	8	10½
(83)	653 „	0	15	6¼	(84)	287 „	0	6	1¼
(85)	489 „	0	19	4½	(86)	227 „	0	9	5¾
(87)	1728 „	0	14	11¼	(88)	906 „	0	4	4¾
(89)	517 „	0	11	6¾	(90)	885 „	0	16	10¼
(91)	227 „	0	0	8	(92)	472 „	0	0	9
(93)	757 „	0	0	10	(94)	365 „	0	0	7½
(95)	277 „	0	0	5¼	(96)	1325 „	0	0	5¾
(97)	580 „	0	0	10½	(98)	3170 „	0	0	11¾
(99)	455 „	0	0	7¾	(100)	257 „	0	0	8¾

**Ex. 19.****SIMPLE PROPORTION.**

(1) If the weight of 15 quarts of milk be 620 ounces, how many ounces will 18 quarts weigh?

(2) When the worth of 27 sheep is £60, what is the worth of 63 sheep?

(3) How many pairs of boots would cost £28, if the cost of 28 pairs be £16?

(4) Bought 247 cwt. of iron for £95: what did 169 cwt. cost?

(5) A piece of work is done by 18 men in 16 days: how long would 15 men have taken to do it?

(6) If 18 horses require daily 128 lb. of oats, how much would 33 horses require?

(7) When 145 bushels of corn cost £34, what sum must be given for 87 bushels?

(8) The amount of the duty on 48 gallons of brandy is £25: how much is it on 57 gallons?

(9) If 15 horses eat daily 448 lb. of hay and 148 lb. of corn, what quantity of each will 36 horses consume?

(10) If 32 horses consume daily 68 stone 4 lb. of hay, how much will 56 horses consume?

(11) If 20 men perform a piece of work in 12 days, how many men could do it in  $7\frac{1}{2}$  days?

(12) In what time would 17 men finish a piece of work which 14 men would finish in 9 hrs. 25 min.?

(13) How much is 127 lb. of coffee worth at the rate of 15s. 6d. for 13 lb.?

(14) What amount of British money is equivalent

to 1343 francs, when 4266 francs will discharge a debt of £170 17s. 9d.?

(15) The exact weight of 623 sovereigns should be 160 troy ounces: what should be the weight of 22 sovereigns?

(16) A certain journey is now usually performed in  $5\frac{1}{4}$  hours, being at the rate of 26 miles an hour; formerly it used to occupy 14 hours: what was then the average rate per hour?

(17) If 35 horses cost £1 14s.  $4\frac{1}{2}$ d. a day for hay, how many of them cost £1 7s. 6d.?

(18) When £2 15s.  $10\frac{1}{2}$ d. is paid for a quarter's consumption of gas, at 3s. 9d. per 1000 cubic feet, how many feet have been consumed?

(19) If 80 labourers could excavate 500 cubic yards of earth in 5 hrs. 12 min., how many could do the same work in  $3\frac{1}{4}$  hours?

(20) If the 4 lb. loaf should cost  $7\frac{1}{2}$ d. when wheat is 6s. 3d. a bushel, what should it cost when wheat is 45s. a quarter?

(21) The value of 17 ac. 3 ro. 10 po. is £444 12s.: how much of the land is worth £323 14s.?

(22) If 88 sq. yds. 6 ft. of asphalte paving cost £53 11s., what extent of such paving should cost £47 12s.?

(23) A quantity of cotton weighing 3 cwt. 1 qr. 26 lb. is worth £9 19s. 4d.: how much is that per cwt.?

(24) The rent of 2 ac. 1 ro. 24 po. is £5 14s.: how much is that per acre?

(25) A bankrupt's debts amount to £5325 19s. 5d., and his assets to £2711 10s.: how much does his estate yield in the pound?

(26) A bankrupt owes £1327 6s. 8d., and his assets yield 6s. 9d. in the pound: what total amount will his creditors receive?

(27) A bankrupt owes his creditors £1417 12s. 6d., and the whole value of his estate is only £515 10s.: how much can he pay in the pound?

(28) A bankrupt's assets amounted to £373 3s. 6d., yielding 7s. 8d. in the pound to his creditors: how much did he owe?

(29) The debts of a bankrupt amount to £7000, and he can pay 8s. 4d. in the pound: how much will a creditor receive whose claim amounts to £256 10s. 6d.?

(30) If the cost of 13 tons 3 cwt. 35 lb. of potatoes be £65 8s. 7d., what quantity can be bought for £25 12s. 6d.?

(31) What is the worth of 3 gall. 3 qts.  $1\frac{1}{2}$  pt. of rum, if the worth of 4 gall.  $1\frac{1}{2}$  pt. be £3 16s.?

(32) If 17 gall. 3 qts.  $1\frac{3}{4}$  pt. of rum be worth £16 11s. 8d., how much of it is worth £11 18s. 6d.?

(33) If 173 sq. yds. 3 ft. of paving cost £103 5s. 6d., what is the cost of 159 sq. yds.  $5\frac{1}{2}$  ft.?

(34) Find, to the nearest farthing, the total amount of 12 lb. 10 oz. beef, at  $10\frac{1}{2}$ d. the lb., and 7 lb. 13 oz. bacon, at  $9\frac{1}{2}$ d.

(35) Calculate, to the nearest farthing, the whole cost of 3 stone 5 lb. 11 oz. mutton, at 6s. 5d. per stone of 8 lb., and 7 lb. 9 oz. veal, at  $9\frac{1}{2}$  per lb.

(36) An exchange is made of 16 st. 7 lb. of mutton (8 lb. to the stone) for 30 st. 12 lb. of rice (14 lb. to the stone). The rice is valued at  $2\frac{1}{2}$ d. a lb.: at how much per lb. is the mutton valued?

(37) A wall has been built in 26 days by 6 men,

working 9 hours a day : how many men working  $9\frac{3}{4}$  hours a day could have built it in 18 days ?

(38) A person's gross income is £340 17s. 6d., which is reduced by income tax to the net sum of £335 8s. 10 $\frac{1}{2}$ d. : how much is the tax per pound ?

(39) If 27 bales of cotton, each 375 lb., cost £177 15s., how many bales, each 324 lb., should, at the same rate, cost £142 4s. ?

(40) When there are  $6\frac{1}{2}$  gallons of water in a cistern capable of holding 175 gallons, the supply pipe is turned on, and in 8 min. 24 sec. the quantity in the cistern is 74 gallons : how much longer must the pipe run that the cistern may be filled ?

(41) The gross weight of a quantity of goods was reduced to 13 cwt. 29 lb. net weight, a deduction having been allowed for waste at the rate of  $17\frac{1}{2}$  lb. per cwt. : what was the gross weight ?

(42) A certain quantity of excavation work could be done in 12 days by 54 labourers, working  $8\frac{3}{4}$  hours a day. If 15 days are allowed for the work, but only 42 labourers can be had, how many hours a day must these work to complete the excavation in the time allowed ?

(43) If 28 bushels of oats weigh 9 cwt. 1 qr. 14 lb., and 27 bushels of barley weigh 12 cwt.  $12\frac{3}{4}$  lb., how many bushels of barley are equal in weight to 268 bushels of oats ?

(44) A gentleman, after paying an income tax of 7d. in the pound, found his net income to be £2818 16s. 3 $\frac{1}{2}$ d. : what was his gross income ?

(45) How many lb. of oats are equal in bulk to 150 lb. of wheat, when 18 bushels of oats weigh 6 cwt. 21 lb., and 14 bushels of wheat weigh  $7\frac{1}{2}$  cwt. ?



(46) If 15 cubic feet of cast iron weigh 58 cwt. 37 lb., and 17 cubic feet of wrought iron weigh 72 cwt. 67 lb., how many cubic feet of wrought iron are equal in weight to 3 cub. ft. 525 in. of cast iron?

(47) Supposing 7 cubic feet of copper to weigh 33 cwt. 2 qrs.  $8\frac{1}{2}$  lb., and 9 cubic feet of lead to weigh 57 cwt.  $19\frac{3}{4}$  lb., what weight of copper is equal in bulk to 3 cwt. 3 qrs. 3 lb. of lead?

(48) A youth sets out to walk at the rate of 3 mi. 660 yards an hour, and 20 minutes afterwards is followed by another youth who walks 4 miles an hour: in what time will the latter overtake the former?

(49) Two trains run from A to B, a distance of 14 miles. The speed of the first train is 24 miles an hour. The second train starts 13 minutes later than the first, and arrives at B 10 minutes behind the first. Required the rate per hour of the second train.

(50) A train leaves a certain station at 2 o'clock, running 21 miles an hour: at what hour must another train, running 27 miles an hour, leave the same station, and follow the former train, so as to overtake it at 12 minutes past 6?

(51) I have bought  $13\frac{1}{2}$  gallons of rum at 16s. 3d. a gallon: how many pints may I reserve for private use, that, by selling the remainder at 17s. 4d. a gallon, I may recover the prime cost of the whole?

**Ex. 20.****BILLS OF PARCELS.**

Complete the two following bills:

- (1) Mr. William Mason,  
Bought of Charles Rogers.

1877.

Oct. 3.	3 salmon, wt. 46 lb., at 1s. 10d. a lb.	. £
	15 doz. oysters, at 1s. 4d. a doz.	. .
	7 pair of soles, at 1s. 4d. a pair	. .
	5 ditto at 1s. 2d. „	. .
	26 lobsters, at 1s. 1½d. each	. . .
		<hr/> £

- (2) Mr. W. Alison, Dr.  
To R. W. Ferguson & Co.  
Nov. 14th, 1877.

Oct. 13.	To Bill delivered . . . . .	£1 3 4
Nov. 5.	5 lb. tea, at 3s. 3d. . . . .	
	7 lb. coffee, at 1s. 4d. . . . .	
	6 lb. lump sugar, at 6½d. . . . .	
	8 lb. moist do. at 3½d. . . . .	
		<hr/> £

(3) Mrs. Walters buys of Messrs. Ingram & Johnstone—57 yds. black silk at 4s. 11d. a yard, 11½ yds. velvet at 10s. 11d., 27 yds. ribbon velvet at 9½d., and 19 yds. calico at 10½d. Make out the bill.

- (4) J. Johnstone, Esq., buys of Messrs. Thompson

& Willis—5 doz. port at 63s. a doz., 3 doz. do. at 46s., 5 doz. sherry at 53s., 4 doz. claret at 32s.,  $1\frac{1}{2}$  gall. brandy at 24s. 6d. a gall.,  $1\frac{1}{2}$  gall. whisky at 18s. 4d., and  $3\frac{1}{2}$  doz. pints pale ale at 4s. 6d. a doz. Make out the bill.

(5) T. Oldfield, Esq., buys of Messrs. Ordway & Son— $3\frac{1}{2}$  lb. tea at 3s. 4d.,  $2\frac{1}{4}$  lb. do. at 2s. 10d., 5 lb. coffee at 1s. 7d., 3 lb. do. at 1s. 4d.,  $2\frac{1}{2}$  lb. cocoa at 1s. 4d., 9 lb. lump sugar at  $6\frac{1}{2}$ d., 7 lb. moist sugar at  $4\frac{1}{2}$ d., 5 lb. do. at  $3\frac{1}{2}$ d.,  $8\frac{1}{2}$  lb. Osborne biscuits at  $9\frac{1}{2}$ d. Make out the bill.

(6) Mr. Prescott owes Mr. Walter Sharp for goods bought Sept. 18th, 1877, amounting to £1 10s. 3d., as per bill delivered, and for goods bought Oct. 5th, as follows: Pair of fowls at 2s. 9d. each, a ham, wt.  $10\frac{1}{4}$  lb., at 11d. a lb., 3 lb. fresh butter at 1s.  $9\frac{1}{2}$ d., 4 lb. salt do. at 1s. 4d.,  $10\frac{1}{2}$  lb. cheese at  $11\frac{1}{2}$ d., and  $1\frac{1}{2}$  dozen eggs at 6 for 7d. Make out the bill.

(7) Dr. Hanway buys of Mr. Richard Stevens— $\frac{1}{2}$  ream ruled foolscap at 14s. 3d. a ream, 3 quarter-reams note at 5s. 6d. a ream, 275 envelopes at 7d. a hundred, 2 gross steel pens at 1s. 5d. a gross, 1 dozen lead pencils = 1s. 4d., and 1 bottle of ink = 2s. 4d. Make out the bill.

(8) Thomas Jameson, Esq., owes Mr. A. Hewetson for beef,  $11\frac{1}{4}$  lb. at  $11\frac{1}{2}$ d., ditto, 5 lb. at  $7\frac{1}{2}$ d., leg of mutton,  $8\frac{1}{4}$  lb. at  $10\frac{1}{2}$ d., veal,  $6\frac{1}{2}$  lb. at  $9\frac{1}{2}$ d., and beef suet, 5 lb. at 8d. Make out the bill, calculating to the nearest farthing.

(9) Mr. Henry Wishart buys of Messrs. Rotherham & Smith—Bacon, 7 lb. 11 oz. at  $11\frac{1}{2}$ d. per lb., cheese, 6 lb. 5 oz. at  $10\frac{1}{2}$ d., a ham, 12 lb. 6 oz. at  $9\frac{1}{4}$ d., butter,

3 lb. at 1s. 9d., and eggs, 2 doz. at 7 for 10d. Make out the bill to the nearest farthing.

(10) Mrs. Robertson buys of Messrs. T. & F. Morris—Beef, 15 lb. 3 oz. at  $10\frac{1}{2}d.$  per lb., mutton, 10 lb. 10 oz. at  $9\frac{1}{2}d.$ , veal, 6 lb. 13 oz. at  $9d.$ , and 3 pair of kidneys at  $4\frac{1}{2}d.$  a pair. Make out the bill to the nearest farthing.

(11) Mr. John Stanley sends in a bill to Mr. Samuel Brown, amounting to £2 5s. 8d.: the several charges being 21s. 8d. for tea at 3s. 4d. a lb., 9s. 11d. for coffee at 1s. 5d. a lb., 4s.  $1\frac{1}{2}d.$  for 9 lb. of loaf sugar, 3s.  $2\frac{1}{2}d.$  for 11 lb. of moist sugar, and the cost of 9 lb. of luncheon biscuit. Make out the bill, specifying the quantities with the prices.

(12) Mrs. Attwood is Dr. to Messrs. Evans, Wright, & Co. for amount of Bill delivered, Feb. 14th, 1878, £1 15s. 6d., and for goods bought on Feb. 21st, as follows: Ribs of beef, 10 lb. 7 oz. at 11d. a lb., leg of beef, 4 lb. 9 oz. at 8d., loin of mutton, 5 lb. 14 oz. at  $10\frac{1}{2}d.$ , and beef suet,  $4\frac{1}{2}$  lb. at  $8\frac{1}{2}d.$  Make out the bill to the nearest farthing.

(13) Mr. A. F. Miller sends to Mrs. Parkinson a bill for mutton amounting to 7s. 9d. at 10d. a lb., beef amounting to 10s.  $5\frac{3}{4}d.$  at  $11\frac{1}{2}d.$  a lb., and another quantity of beef at  $8\frac{1}{2}d.$  a lb., the amounts being calculated to the nearest farthing. Make out the bill to a total of 26s. 4d., specifying the several quantities.

## TABLES OF WEIGHTS AND MEASURES.

### TROY WEIGHT.

24 grains	= 1 pennyweight ( <i>dwt.</i> )
20 pennyweights	= 1 ounce ( <i>oz.</i> )
12 ounces (= 5760 grs.)	= 1 pound ( <i>lb.</i> )

This table is used in weighing gold and silver, and other things of a costly or delicate kind.

### AVOIRDUPOIS WEIGHT.

16 drams	= 1 ounce ( <i>oz.</i> )
16 ounces (= 7000 grs.)	= 1 pound ( <i>lb.</i> )
28 pounds	= 1 quarter ( <i>qr.</i> )
4 quarters (= 112 lb.)	= 1 hundredweight ( <i>cwt.</i> )
20 hundredweights	= 1 ton.

This table is used in weighing tea, coffee, sugar, meat, and such other things as are of a less costly kind than gold and silver.

The Avoirdupois pound is heavier than the Troy pound; but the Avoirdupois ounce is not so heavy as the Troy ounce.

### LINEAL MEASURE.

12 inches	= 1 foot ( <i>ft.</i> )
3 feet	= 1 yard ( <i>yd.</i> )
$5\frac{1}{2}$ yards	= 1 rod or pole ( <i>po.</i> )
40 poles (= 220 yds.)	= 1 furlong ( <i>fur.</i> )
8 furlongs (= 1760 yds.)	= 1 mile ( <i>mi.</i> )

In Cloth Measure the yard is divided into 4 quarters, and the quarter into 4 nails.

The chain used in Land Measure is 22 yards long, and is divided into 100 links.

### SQUARE OR SURFACE MEASURE.

144 square inches	= 1 square foot.
9 square feet	= 1 square yard.
$30\frac{1}{4}$ square yards	= 1 square rod, pole, or perch.
40 square poles	= 1 rood of land.
4 roods (= 4840 sq. yds.)	= 1 acre of land.

In Land Measure, 10 square chains or 100000 square links make an acre.

### CUBIC OR BULK MEASURE.

1728 cubic inches = 1 cubic foot.  
27 cubic feet = 1 cubic yard.

### LIQUID MEASURE.

4 gills = 1 pint (*pt.*)  
2 pints = 1 quart (*qt.*)  
4 quarts = 1 gallon.  
36 gallons = 1 barrel of beer.  
54 gallons = 1 hogshead of beer (*hhd.*)  
63 gallons = 1 hogshead of wine.  
2 hogsheads = 1 butt or pipe.

### DRY MEASURE.

2 pints = 1 quart.  
2 quarts = 1 pottle.  
4 quarts = 1 gallon.  
2 gallons = 1 peck.  
4 pecks = 1 bushel.  
8 bushels = 1 quarter (*qn.*)  
3 bushels, or 2 cwt., make 1 sack of coals.

### TIME.

60 seconds = 1 minute.  
60 minutes = 1 hour.  
24 hours = 1 day.  
7 days = 1 week.  
365 days = 1 common year.  
366 days = 1 leap year.  
365½ days = 1 average year.

A Common Year contains 52 weeks 1 day; but we usually speak of the year as containing 52 weeks.

The year is divided into 12 months, their names and the number of days in each being as follows:—

January has 31 days; February 28 in common years, 29 in leap years; March 31; April 30; May 31; June 30; July 31; August 31; September 30; October 31; November 30; December 31.

These are called the Calendar Months; but we sometimes call 4 weeks a month, thus making the common year to consist of 13 months and 1 day.







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HUNTER'S  
STANDARD ARITHMETIC

A GRADUATED SCHEME OF ARITHMETICAL EXAMPLES  
ADAPTED TO THE REGULATIONS OF  
THE NEW CODE

BY THE  
REV. JOHN HUNTER, M.A.

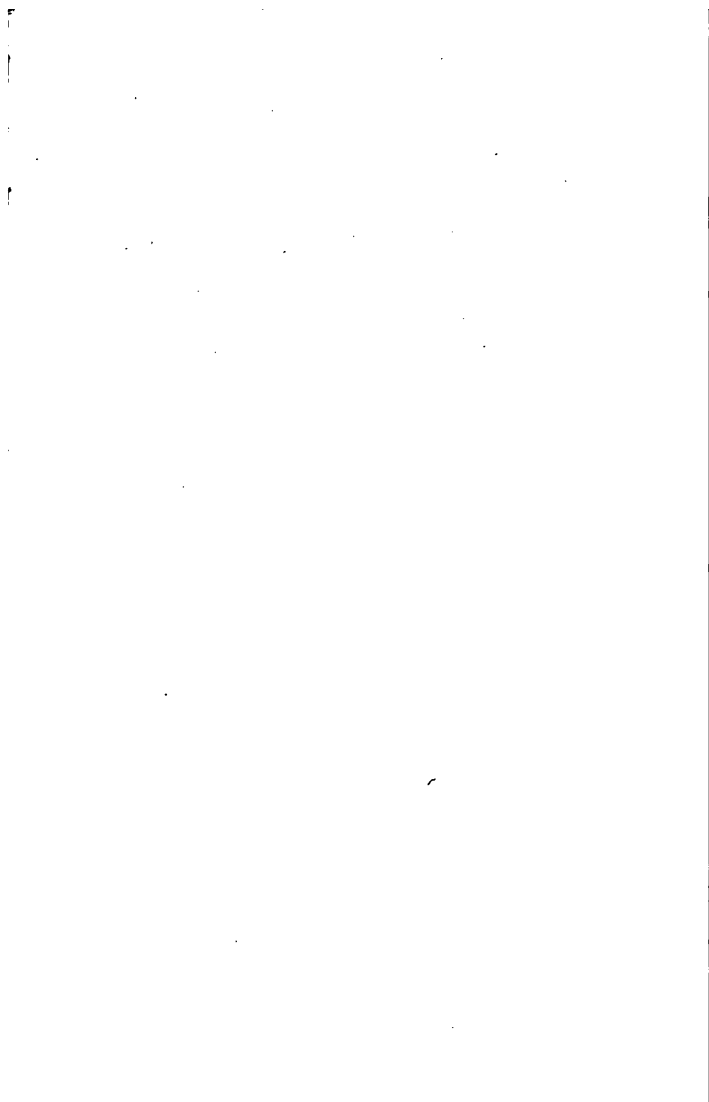
AUTHOR OF 'A STANDARD ALGEBRA'

PART III.  
(STANDARD VI.)

LONDON  
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*Price Twonence*



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## ADVERTISEMENT.

IN this ARITHMETICAL MANUAL, which is adapted for School Board, National, and other Elementary Schools, the special work of successive Standards is as follows :

### *PART I.*

Standard	I.	includes	Exercises	1-3.
"	II.	"	"	4-7.
"	III.	"	"	8-11.

### *PART II.*

Standard	IV.	includes	Exercises	12-17.
"	V.	"	"	18-20.

### *PART III.*

Standard	VI.	includes	Exercises	21-50.
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# STANDARD ARITHMETIC.

## PART III.

### Ex. 21.

#### COMPOUND PROPORTION.

(1) What quantity of corn is consumed by 9 horses in 32 days, if 8 of them consume 2080 lb. in 21 days?

(2) How many horses eat 343 stone of hay in 21 days, if 245 stone be consumed by 9 horses in 10 days?

(3) If 15 horses eat 527 stone of hay in 16 days, in what time will 6 horses eat 217 stone?

(4) If 21 men can do a piece of work in 15 days, working 9 hours a day, how many hours a day must 27 men work to do the same in 10 days?

(5) If £540 bear £12 interest in 8 months, what interest, at the same rate, will £480 bear in 5 months?

(6) If 9 men, each with a pair of horses, can plough 16 acres in 14 hours, how many acres could 7 of the men plough in 17 hours?

(7) If 3 women can dibble 52 perches of mangold-wurzel seed in 2 hrs. 32 min., in what time could 4 women dibble 65 perches?

(8) If the expense of supplying 16 haymakers with ale for 8 weeks be £19 13s. 4d., how many of them does £9 4s. 4½d. provide with ale for 5 weeks?

(9) If £1 12s. 1½d. be the interest on £184 for 63 days, in what time, at the same rate, will £2 13s. 0½d. be the interest on £252?

(10) Two fields, one 5 acres, the other 5½ acres, yield the same total value of wheat. The produce of the former is 3 qu. 1 bu. per acre, worth 6s. 6½d. per bushel; that of the latter is 3 qu. 6 bu. per acre: what is the bushel of its produce worth?

(11) If 42 days' interest on £629 7s. 6d. be £27 11s., on what sum will 35 days' interest be £14 14s. 10d.?

(12) If 2290 cubic yards of clay can be dug in 6 days by 39 labourers working 9½ hours a day, how many cubic yards can be dug in 9 days by 38 labourers working 10 hours a day?

(13) What length of a trench that is 5 feet wide and 3 feet deep can be cut by 21 men in 10 hours, if one that is 108 yards long, 4½ feet wide, and 3¾ feet deep, can be cut by 15 men in 13½ hours?

(14) If 18 men in 12 hours can form a trench 76 yards long, 4 ft. 4 in. wide, and 4 ft. 6 in. deep, when the ground is of 3 degrees of hardness; in what time would 14 men form a trench 91 yards long, 4 ft. 9 in. wide, and 3 ft. 9 in. deep, when the ground is of 4 degrees of hardness?

(15) A draper sells 17 yards of silk for £4 13s. 4d., the silk having cost him £12 per piece of 51 yards: for what must he sell 24 yards of silk that cost him 11 guineas per piece of 56 yards to gain at the same rate?

(16) If a trench  $87\frac{1}{2}$  yards long, 4 feet wide, and 4 feet deep, could be cut by 28 pioneers in 5 hours; how many pioneers, one-fourth better in expertness, could cut a trench 116 yards long,  $1\frac{1}{2}$  yard wide, and  $1\frac{1}{4}$  yard deep, in 5 hrs. 48 min.?

(17) If 12 equally expert women could do 55 yards of plain hand-sewing in  $6\frac{1}{2}$  hours, in what time could 9 of them do 76 yards of plain machine-sewing, supposing 117 yards to be done by the machine in the time that  $5\frac{1}{2}$  yards are done by hand?

(18) A set of 9 men of uniform ability can mow as much per hour as another set of 8 men of uniform ability. If 3 men of the former set can mow 2 acres of grass in 5 hours, in what time could 4 men of the latter set mow  $2\frac{1}{4}$  acres?

**Ex. 22.****LEAST COMMON MULTIPLE.**

Find the L. C. M. of—

- |                              |                                  |
|------------------------------|----------------------------------|
| (1) 6, 8, 9.                 | (2) 8, 15, 20.                   |
| (3) 8, 18, 12, 16.           | (4) 9, 7, 13, 18.                |
| (5) 35, 23, 14, 20.          | (6) 2, 3, 4, 5, 6, 7, 8, 9.      |
| (7) 14, 15, 21, 25.          | (8) 14, 26, 91, 42, 16.          |
| (9) 24, 27, 33, 40, 36.      | (10) 20, 27, 65, 48, 39.         |
| (11) 12, 16, 18, 21, 32, 35. | (12) 105, 108, 90, 112.          |
| (13) 85, 54, 45, 68, 72.     | (14) 34, 35, 18, 51, 28, 20, 84. |
| (15) 35, 48, 57, 28, 16, 95. | (16) 345, 1633, 1278, 621.       |
| (17) 779, 119, 1197, 1722.   | (18) 957, 962, 1001, 1073.       |

**Ex. 23.****VULGAR FRACTIONS.**

*Mutual Reduction of Improper Fractions and Whole or Mixed Numbers.*

Reduce to Whole or Mixed Numbers—

- (1)  $\frac{11}{4}, \frac{24}{9},$  and  $\frac{56}{8}.$  (2)  $\frac{31}{31}, \frac{35}{7},$  and  $\frac{43}{11}.$   
 (3)  $\frac{251}{19}, \frac{239}{16},$  and  $\frac{391}{17}.$  (4)  $\frac{516}{473}, \frac{1015}{29},$  and  $\frac{2244}{119}.$

Reduce to Improper Fractions—

- (5)  $9\frac{3}{8}, 13\frac{3}{7},$  and 13. (6)  $30\frac{1}{4}, 5\frac{11}{12},$  and  $123\frac{1}{23}.$   
 (7) 25,  $11\frac{13}{17},$  and  $14\frac{3}{14}.$  (8)  $60\frac{29}{33}, 49\frac{49}{101},$  and  $25\frac{23}{25}.$

**Ex. 24.**

*Reduction of Fractions to the Least Common Denominator.*

- (1)  $\frac{5}{8}, \frac{7}{12}.$  (2)  $\frac{3}{8}, \frac{1}{6}, \frac{7}{10}.$  (3)  $\frac{2}{9}, \frac{5}{6}, \frac{3}{4}.$   
 (4)  $\frac{11}{21}, \frac{19}{28}.$  (5)  $\frac{4}{9}, \frac{7}{18}, \frac{17}{33}.$  (6)  $\frac{13}{14}, \frac{5}{24}, \frac{11}{21}.$   
 (7)  $\frac{1}{16}, \frac{4}{25}.$  (8)  $\frac{17}{8}, \frac{47}{20}, \frac{67}{18}.$  (9)  $\frac{7}{9}, \frac{7}{16}, \frac{7}{25}.$   
 (10)  $\frac{1}{10}, \frac{1}{16}, \frac{1}{15}, \frac{1}{27}.$  (11)  $\frac{5}{52}, \frac{11}{36}, \frac{14}{65}, \frac{29}{30}.$

**Ex. 25.**

*Addition of Fractions.*

- (1)  $\frac{1}{2} + \frac{2}{5} + \frac{3}{4}.$  (2)  $\frac{3}{8} + \frac{5}{6} + \frac{2}{9} + \frac{1}{4}.$   
 (3)  $4\frac{4}{7} + \frac{5}{6} + 6\frac{8}{21}.$  (4)  $\frac{1}{4} + \frac{7}{10} + \frac{7}{12} + \frac{2}{16}.$   
 (5)  $\frac{1}{12} + \frac{1}{21} + \frac{1}{18} + \frac{1}{28}.$  (6)  $\frac{1}{20} + \frac{5}{12} + \frac{11}{18} + \frac{8}{15} + \frac{15}{16}.$



- (7)  $\frac{9}{16} + \frac{16}{35} + \frac{11}{28} + \frac{47}{80}$ . (8)  $3\frac{5}{8} + 4\frac{3}{8} + 5\frac{4}{9} + 6\frac{11}{12} + 7\frac{5}{24}$ .  
 (9)  $\frac{15}{56} + \frac{23}{63} + \frac{23}{91}$ . (10)  $1\frac{1}{90} + 2\frac{3}{16} + 1\frac{5}{24} + 3\frac{7}{18} + 4\frac{9}{40}$ .  
 (11)  $7\frac{13}{51} + \frac{4}{61} + 3\frac{19}{64} + 5\frac{7}{68}$ . (12)  $5\frac{5}{117} + 2\frac{2}{143} + 1\frac{1}{156}$ .  
 (13)  $\frac{20}{33} + \frac{17}{87} + \frac{45}{116}$ . (14)  $\frac{1}{391} + \frac{14}{345} + \frac{60}{527}$ .  
 (15)  $\frac{144}{899} + \frac{1001}{1392} + \frac{38}{1271}$ . (16)  $\frac{26}{331} + \frac{27}{360} + \frac{28}{397} + \frac{29}{352}$ .

**Ex. 26.***Subtraction of Fractions.*

- (1)  $\frac{3}{4} - \frac{5}{9}$ . (2)  $\frac{4}{15} - \frac{6}{25}$ . (3)  $\frac{5}{6} - \frac{3}{8}$ .  
 (4)  $5 - \frac{4}{9}$ . (5)  $\frac{7}{18} - \frac{5}{28}$ . (6)  $\frac{13}{42} - \frac{11}{56}$ .  
 (7)  $20 - \frac{17}{48}$ . (8)  $\frac{5}{48} - \frac{1}{81}$ . (9)  $\frac{57}{85} - \frac{15}{68}$ .  
 (10)  $8\frac{17}{91} - 3\frac{17}{117}$ . (11)  $5\frac{14}{75} - 2\frac{13}{60}$ .  
 (12)  $16\frac{23}{32} - 15\frac{95}{112}$ . (13)  $103\frac{4}{95} - 47\frac{24}{209}$ .  
 (14)  $\frac{13}{45} + \frac{23}{40} - \frac{16}{25}$ . (15)  $15\frac{17}{36} - 4\frac{5}{28} - 7\frac{6}{63}$ .  
 (16) What must be added to the sum of  $\frac{1}{3}$ ,  $\frac{5}{6}$ ,  $\frac{2}{7}$ , and  $\frac{7}{9}$ , to make up 7?

(17) From the sum of  $\frac{5}{345}$  and  $\frac{28}{255}$  subtract the difference of  $\frac{1}{23}$  and  $\frac{3}{17}$ .

(18) Find the value of  $17 - \frac{55}{86} + \frac{5}{63} - 18\frac{5}{64} + 2\frac{300}{301}$ .

**Ex. 27.***Multiplication of Fractions.*

- (1)  $\frac{4}{9} \times \frac{5}{6}$ . (2)  $\frac{7}{8} \times \frac{12}{25}$ . (3)  $\frac{71}{13} \times \frac{5}{6}$ .  
 (4)  $\frac{15}{16}$  of  $\frac{20}{31}$ . (5)  $\frac{5}{7} \times \frac{6}{11} \times \frac{9}{10}$ . (6)  $\frac{3}{4}$  of  $\frac{17}{35} \times \frac{28}{33}$ .  
 (7)  $\frac{9}{14}$  of  $\frac{9}{14}$  of  $\frac{49}{60}$ . (8)  $\frac{15}{16}$  of  $3\frac{3}{11} \times \frac{12}{25}$ . (9)  $3\frac{2}{11} \times 4\frac{7}{27} \times 3\frac{1}{7}$ .  
 (10)  $15 \times \frac{15}{16} \times 3\frac{1}{25}$ . (11)  $\frac{5}{18} \times \frac{2}{7}$  of  $\frac{9}{28}$ . (12)  $\frac{52}{57} \times \frac{76}{81} \times \frac{83}{65}$ .  
 (13)  $365\frac{5}{13} \times 52$ . (14)  $3147\frac{13}{21} \times 14$ . (15)  $1391\frac{10}{21} \times 36$ .  
 (16)  $863\frac{23}{75} \times 63$ . (17)  $146\frac{191}{198} \times 84$ . (18)  $965\frac{13}{16} \times 111$ .  
 (19)  $\frac{12}{25} \times \frac{12}{49} \times \frac{10}{27} \times 3\frac{3}{4} \times 2\frac{4}{5}$ . (20)  $\frac{91}{114}$  of  $16 \times 5\frac{3}{20} \times \frac{17}{16}$  of  $4\frac{4}{7}$ .

**Ex. 28.***Division of Fractions.*

- (1)  $\frac{6}{7} \div \frac{9}{10}$ . (2)  $\frac{14}{15} \div \frac{21}{40}$ . (3)  $\frac{27}{64} \div \frac{9}{18}$ .  
 (4)  $\frac{21}{32} \div \frac{15}{56}$ . (5)  $5\frac{3}{8} \div 1\frac{3}{4}$ . (6)  $\frac{17}{18} \div \frac{19}{20}$ .  
 (7)  $4\frac{4}{21} \div 132$ . (8)  $12\frac{3}{4} \div \frac{34}{35}$ . (9)  $152 \div 66\frac{1}{2}$ .  
 (10)  $29\frac{4}{7} \div 161$ . (11)  $129\frac{5}{8} \div 122$ . (12)  $12\frac{3}{4} \div 56\frac{7}{8}$ .  
 (13)  $129 \div 4\frac{7}{9}$ . (14)  $481 \div 1517$ . (15)  $1922\frac{1}{3} \div 310\frac{1}{4}$ .  
 (16)  $\frac{18}{35}$  of  $\frac{49}{80} \div \frac{14}{55}$ . (17)  $\frac{13}{56} \div (\frac{11}{40} \text{ of } \frac{39}{49})$ .  
 (18)  $(\frac{23}{56} \div \frac{18}{49})$  of  $\frac{89}{70}$ . (19)  $61546\frac{17}{45} \div 49\frac{4}{81}$ .  
 (20)  $1629\frac{58}{299} \div 17\frac{59}{529}$ .

**Ex. 29.***Complex Fractions.*

Simplify the following expressions—

- (1)  $\frac{27}{50\frac{5}{8}}$ . (2)  $\frac{8\frac{7}{28}}{12\frac{4}{15}}$ . (3)  $\frac{5}{12}$  of  $\frac{53\frac{11}{17}}{9\frac{1}{21}}$ .  
 (4)  $\frac{1\frac{2}{3}}{11\frac{1}{11}}$  of  $\frac{16\frac{17}{18}}{17\frac{18}{19}}$ . (5)  $\frac{14\frac{5}{12} - 8\frac{7}{8}}{4\frac{4}{5} \div 4\frac{1}{15}}$ .  
 (6)  $\frac{\frac{3}{4} \text{ of } (14\frac{7}{10} \div \frac{3}{5})}{\frac{1}{21} \div \frac{3}{5}}$ . (7)  $6 + \frac{1}{9 + \frac{1}{5\frac{1}{3}}} - 5 + \frac{1}{4 + \frac{1}{3\frac{1}{4}}}$ .  
 (8)  $\frac{\frac{29}{92} \text{ of } (\frac{1}{11\frac{2}{3}} + \frac{2\frac{1}{3}}{9} + \frac{2\frac{1}{3}}{13\frac{1}{2}})}{18\frac{1}{12} - \frac{5}{12} \text{ of } (7\frac{2}{3} - 3\frac{3}{4} + 3\frac{5}{6})}$ .

**Ex. 30.***Reduction of Concrete Fractions.*

Express—

- (1)  $\frac{2}{9}$  of a shill. in pounds. (2) £  $\frac{3}{105}$  in shill.  
 (3)  $\frac{8}{9}$  of a penny in pounds. (4) £  $\frac{7}{18}$  in pence.

- |  |  |
|--|--|
| (5) $3\frac{1}{2}d.$ in shill.           | (6) 10s. 6d. in pounds.  |
| (7) $\pounds\frac{5}{7}$ in shill.       | (8) $\pounds\frac{7}{18}$ in pence.  |
| (9) $\pounds\frac{9}{25}$ in hf. pence.  | (10) $\pounds\frac{1}{1000}$ in farth.   |
| (11) 5s. $3\frac{3}{4}d.$ in pounds.     | (12) 2s. $7\frac{1}{2}d.$ in shill.  |
| (13) $\frac{8}{27}$ of a shill. in guin. | (14) $\frac{1}{364}$ guin. in pence.   |
| (15) $\frac{5}{13}$ guin. in pounds.     | (16) $\pounds\frac{5}{16}$ in guin.  |
| (17) $\frac{5}{8}$ crown in hf. guin.    | (18) 4s. $9\frac{3}{4}d.$ in guin.   |
| (19) $\frac{15}{25}$ cwt. in tons.       | (20) $\frac{5}{21}$ cwt. in lb.  |
| (21) 36 lb. av. in cwt.                  | (22) $54\frac{4}{9}$ lb. av. in tons.  |
| (23) $\frac{21}{10}$ oz. av. in qr. cwt. | (24) $\frac{35}{36}$ of $\frac{8}{49}$ cwt. in oz.                               |
| (25) $\frac{9}{200}$ lb. tr. in oz.      | (26) $\frac{17}{96}$ oz. tr. in gra.   |
| (27) 198 ft. in furl.                    | (28) $5\frac{2}{5}$ in. in yds.  |
| (29) $\frac{8}{75}$ ac. in sq. po.       | (30) $\frac{9}{55}$ ro. in sq. yds.  |
| (31) $145\frac{1}{8}$ sq. yds. in ac.    | (32) $\frac{3}{6\frac{1}{4}}$ of $\frac{5\frac{5}{6}}{6\frac{9}{7}}$ da. in min. |

**Ex. 31.***Fractional Comparison of Concrete Quantities.*

What vulgar fraction is—

- |  |  |
|--|--|
| (1) $2\frac{1}{2}d.$ of 2s. 6d.?                                 | (2) 3s. 9d. of 5s. 3d.?  |
| (3) 16s. $10\frac{1}{2}d.$ of 7s. 6d.?                           | (4) $\pounds 5$ 9s. 3d. of $\pounds 12$ 16s. 6d.?                |
| (5) $\pounds\frac{5}{78}$ of $\frac{56}{85}d.$ ?                 | (6) 13s. $8\frac{4}{5}d.$ of $\pounds 3$ 16s. $6\frac{5}{6}d.$ ? |
| (7) $11\frac{1}{4}$ guin. of $\pounds 6$ 15s. $2\frac{1}{4}d.$ ? |  |
| (8) 2 ft. $6\frac{2}{9}$ in. of 3 yds. $1\frac{1}{5}$ ft.?       |  |
| (9) 1 cwt. 3 qrs. 7 lb. of 3 tons 17 cwt. 18 lb.?                |  |
| (10) $35\frac{1}{8}$ sq. yds. of 2 ac. 2 ro. 16 po.?             |  |

**Ex. 32.***Integral Values of Concrete Fractions.*

Work out the values of—

- |                               |                           |                           |                              |
|-------------------------------|---------------------------|---------------------------|------------------------------|
| (1) $\frac{2}{3}d.$           | (2) $\pounds\frac{5}{9}$  | (3) $\pounds\frac{7}{12}$ | (4) $\pounds 2\frac{11}{28}$ |
| (5) $\frac{5}{12}$ of 2s. 6d. | (6) $\frac{7}{8}$ of 21s. | (7) $\frac{9}{16}$ of 2s. |                              |

- (8)  $\frac{25}{98}$  of  $\frac{3}{10}$  of a guin. (9)  $\frac{45}{87}$  of  $3\frac{2}{7}$  of  $14s. 7\frac{3}{4}d.$   
 (10)  $\frac{7}{11}$  of  $\frac{43}{24}$  of £1 15s. 9d. (11)  $\frac{11}{18}$  cwt. (12)  $2\frac{128}{355}$  tons.  
 (13)  $\frac{97}{99}$  of a mile in fur. po. yds. ft. in.  
 (14)  $£\frac{5}{14} + £\frac{8}{15} + 13\frac{20}{21}s. + \frac{3}{28}d.$   
 (15)  $£\frac{5}{18} + \frac{8}{15}$  guin.  $-\frac{7}{18}$  of  $2s. 6d. + 3\frac{3}{4}d.$   
 (16)  $\frac{17}{24}$  ton  $+ 7\frac{11}{20}$  cwt.  $- 15\frac{1}{35}$  lb.  $- 10\frac{2}{9}$  oz.  
 (17) 7 oz.  $13\frac{15}{28}$  dwt.  $+ 11$  oz. 12 dwt. 13 grs.  $+ 6$  oz.  
 9 dwt. 10 grs.  $- 10$  oz.  $10\frac{10}{21}$  dwt.  $- 5\frac{5}{7}$  oz.  
 (18) 5 qu. 3 bu.  $3\frac{4}{19}$  pks.  $- 4\frac{29}{28}$  bu.  $+ 3$  qu.  $7\frac{1}{18}$  bu.  $- 1$  qu.  
 4 bu.  $0\frac{7}{8}$  pk.  $+ 5$  bu.  $2\frac{7}{12}$  pks.

**Ex. 33.***Miscellaneous Examples in Vulgar Fractions.*

- (1) When  $\frac{5}{8}$  of  $\frac{7}{13}$  of a loaf of bread has been eaten, how much of the loaf will be left?  
 (2) Find the sum of  $\frac{5}{8}$  of  $\frac{7}{16} + \frac{1}{2}$  ( $\frac{5}{8} + \frac{7}{16}$ ).  
 (3) Show that when  $1\frac{14}{15}$  of  $\frac{2}{9}$  of a loaf of bread has been eaten, the remainder will be equal to  $\frac{1}{3}$  ( $1\frac{14}{15} - \frac{2}{9}$ ) of the loaf.  
 (4) Find the value of  $\frac{25\frac{1}{7} + 28\frac{8}{9}}{18\frac{5}{9} - 10\frac{1}{3}}$  of 15 cwt.  
 (5) If 5 bricklayers have built  $\frac{5}{12} + \frac{2}{15}$  of a wall in  $8\frac{1}{4}$  days, in what time may they be expected to build the remainder of it?  
 (6) The lb. troy is 5760 grains, but the lb. avoirdupois is heavier by 1240 grains, what fraction of  $3\frac{3}{4}$  lb. avoirdupois is  $2\frac{1}{3}$  lb. troy?  
 (7) If 11 sq. yds. 1 ft. 120 in. be subtracted from  $\frac{3}{4}$  of a rood, what fraction of an acre will remain?  
 (8) I had a certain sum of money in my purse this morning; but I spent first  $\frac{5}{21}$  of it, and then  $\frac{7}{30}$  of the

remainder, and so had 6s. 6d. left: what sum had I at first?

(9) When  $\frac{1}{28} + \frac{1}{48} + \frac{1}{54}$  of a lb. of coffee is worth  $\frac{11\frac{1}{2}}{288}$  of a penny, and  $\frac{5}{14}$  of  $\frac{7}{18}$  of  $\frac{5}{6}$  of a lb. of tea is worth  $\frac{17}{8}$  of a penny less than  $\frac{4}{13}$  of  $\frac{5}{14}$  of  $3\frac{1}{2}$  lb. of coffee, what is the value of each article per lb.?

(10) A man can perform in 20 days an amount of work which his son could perform in 16 days: in what time could it be done by father and son working together?

(11) One cask contains 100 gallons of wine, and  $\frac{3}{10} + \frac{9}{16} - \frac{1}{12}$  of its contents is equal to  $\frac{11}{12}$  of  $\frac{15}{16}$  of  $\frac{17}{18}$  of the contents of another cask: how many gallons are there in this latter cask?

(12) A and B together can do a piece of work in 3 hrs. 44 min., which B by himself could do in 8 hrs.: in what time could A alone do it?

(13) A can perform in  $8\frac{3}{4}$  days a piece of work which A, B, and C together could perform in  $2\frac{2}{3}$  days. If B by himself could do it in 8 days, in what time could C do it by himself?

(14) A silver salver weighing 40 ounces cost 15 guineas, the cost per ounce for the workmanship being equal to  $\frac{3}{8}$  of that of the metal. Find the worth of the unwrought silver per ounce.

(15) What fraction of a guinea is such that if it be increased by  $\frac{3}{4}$  of itself, and the amount be divided by  $\frac{49}{16}$ , the value of the result will be a sovereign?

(16) (i.) Can 20s. be multiplied by 5 cwt. or by 3s. 4d.?

Explanation is here required.

(ii.) Can 20s. be divided by 5 cwt. or by 3s. 4d.?

Explanation is required.

(iii.) Multiply 4 ac. 28 po. by  $\frac{3 \text{ tons } 1\frac{1}{2} \text{ cwt.}}{4 \text{ cwt. } 1 \text{ qr. } 25 \text{ lb.}}$  of  
 $\frac{14s. 7d.}{£14 \ 7s.}$

(17) A certain fraction is increased by  $\frac{3}{16}$ , the sum is multiplied by  $\frac{9}{25}$ , and  $\frac{1}{35}$  is subtracted from the product; the remainder being then divided by  $\frac{12}{14}$ , the result is found to be equal to the sum of  $\frac{2}{25}$  and  $\frac{3}{40}$ . What was the original fraction?

(18) In what time could A by himself perform a piece of work which he could do with B's help in  $6\frac{2}{3}$  days, with C's help in  $7\frac{1}{2}$  days, or with the help of B and C together in 5 days?

(19) There is an empty cistern having two supply pipes, A and B, of which A alone could fill the cistern in  $4\frac{1}{2}$  hours. It has also a discharge pipe, C. The three pipes are set open together, and the cistern becomes full in 5 hours. If A should then be turned off, in what time would the cistern be empty again?

(20) At what time between 7 and 8 o'clock should H and M, the hour and minute hands of a watch, intercept  $15\frac{7}{8}$  minute spaces?

### Ex. 34.

#### DECIMAL FRACTIONS.

#### *Introductory Examples.*

Express in decimal form—

- (1) 74 hundredths; 4 tenths; 5 hundredths.
- (2) 125 thousandths; 70 hundredths; 16 thousandths.
- (3) 3048 ten-thousandths; 9 thousandths; 7 hundredths.

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(4) 12 thousandths; 26 ten-thousandths; 53 tenths.

(5) 2675 hundred-thousandths; 307 hundredths;  
365 tenths.

(6) 38 ten-thousandths; 7364595 millionths; 480  
thousandths.

(7) 15 units 3 tenths 13 thousandths; 9 units  
9 hundredths 19 millionths; 60 tenths 3 thousandths  
5 hundred-thousandths.

Express in vulgar form and in lowest terms—

(8)  $6\frac{1}{5}$ ;  $\frac{365}{1000}$ ;  $17\frac{28}{100}$ ;  $\frac{75}{100}$ .

(9)  $1\frac{25}{100}$ ;  $\frac{125}{1000}$ ;  $\frac{0875}{10000}$ ;  $18\frac{525}{1000}$ .

(10)  $3\frac{0086}{10000}$ ;  $\frac{00075}{100000}$ ;  $\frac{128}{1000}$ ;  $\frac{011\frac{1}{2}}{1000}$ .

(11)  $3\frac{73\frac{1}{2}}{100}$ ;  $\frac{4183\frac{1}{2}}{1000}$ ;  $1\frac{004\frac{1}{2}}{1000}$ ;  $20\frac{10353\frac{7}{8}}{1000}$ .

(12)  $\frac{093\frac{3}{4}}{1000}$ ;  $\frac{384615\frac{5}{13}}{1000000}$ ;  $\frac{00\frac{5}{8}}{1000}$ ;  $1\frac{000\frac{1}{16}}{1000}$ .

(13) Multiply  $2\cdot356$  by 100;  $\cdot123$  by 10;  $\cdot07$  by 100;  
 $3\cdot5045$  by 1000.

(14) Divide  $34\cdot5$  by 10;  $47\cdot928$  by 100;  $35$  by 10;  
 $2470$  by 100.

(15) Multiply  $\cdot0049$  by 1000;  $123\cdot45$  by 10000;  $\cdot09$   
by 1000;  $47\cdot605$  by 100000.

(16) Divide  $76$  by 1000;  $2\cdot25$  by 100;  $240$  by  
 $1000000$ ;  $\cdot00365$  by 100.

**Ex. 35.**

*Addition and Subtraction of Decimals.*

Find the decimal value of—

(1)  $26\cdot203 + 25\cdot7685 + \cdot689 + 7\cdot89 + 281\cdot78755 +$   
 $\cdot33345.$

(2)  $6\cdot7906 + \cdot67906 + 67\cdot906 + 8\cdot5 + \cdot983 + \cdot56.$

$$(3) \cdot 769387 + \cdot 8369 + \cdot 05848 + \cdot 970333 + \cdot 384 + \cdot 6674.$$

$$(4) \cdot 00625 + 30\cdot 698 + 2\cdot 7535 + 19\cdot 84 + \cdot 1875 + \cdot 8\cdot 096.$$

$$(5) 41\cdot 4305 - 1\cdot 536, \text{ and } 1\cdot 00325 - \cdot 908446.$$

$$(6) 23\cdot 45 - 4\cdot 5678, \text{ and } 101\cdot 20507 - 6\cdot 196.$$

$$(7) 7\cdot 825 - \cdot 62927 + 86\cdot 75 + 17\cdot 9325 - 8\cdot 72 - 24\cdot 4.$$

$$(8) \cdot 9587 - \cdot 479663 + \cdot 32806 + 4\cdot 81524 - \cdot 423745.$$

**Ex. 36.***Multiplication of Decimals.*

$$(1) 3\cdot 924 \times 9$$

$$(2) \cdot 7865 \times 12$$

$$(3) 46\cdot 5204 \times 248$$

$$(4) 14\cdot 32756 \times 4\cdot 5$$

$$(5) \cdot 10916 \times 1\cdot 86$$

$$(6) 3\cdot 04385 \times \cdot 365$$

$$(7) \cdot 000269 \times 45\cdot 9$$

$$(8) \cdot 1045 \times \cdot 1045$$

$$(9) 1268\cdot 75 \times 72\cdot 8$$

$$(10) \cdot 09542 \times 1\cdot 905$$

$$(11) \cdot 7854 \times \cdot 001146$$

$$(12) 4\cdot 5678 \times 2\cdot 7027$$

$$(13) 8925 \times \cdot 09852$$

$$(14) \cdot 00667789 \times \cdot 089$$

$$(15) 781\cdot 25 \times 7\cdot 84$$

$$(16) \cdot 01732 \times 173\cdot 2$$

**Ex. 37.***Division of Decimals.*

$$(1) 22\cdot 3126 \div 8$$

$$(2) \cdot 513 \div 16$$

$$(3) 9456 \div 250$$

$$(4) 5 \div 512$$

$$(5) 12\cdot 9 \div 480$$

$$(6) 30490\cdot 89$$

$$(7) \cdot 502884 \div 549$$

$$(8) 35\cdot 445 \div 7500$$

$$(9) 41\cdot 49 \div 1\cdot 2$$

$$(10) 342\cdot 577 \div 5\cdot 8$$

$$(11) \cdot 057456 \div \cdot 84$$

$$(12) 5\cdot 37174 \div 132$$

$$(13) \cdot 01514592 \div \cdot 001728$$

$$(14) 872\cdot 50809 \div 9\cdot 687$$

$$(15) 4035\cdot 291 \div 502\cdot 84$$

$$(16) 111\cdot 333 \div 174\cdot 64$$



(17) $\cdot 0066229 + \cdot 0824$	(25) $\cdot 345 + 030405$
(18) $418 + 80\cdot 695$	(26) $73\cdot 363 + 2517$
(19) $8096\cdot 76 + 6\cdot 375$	(27) $338 + \cdot 926$
(20) $\cdot 456789 + 37$	(28) $205\cdot 9454 + 365\cdot 563$
(21) $1\cdot 83785 + \cdot 1879$	(29) $47633\frac{3}{4} + 96\cdot 03$
(22) $\cdot 5058 + 6\cdot 272$	(30) $1\cdot 80063 + 26\frac{13}{40}$
(23) $384\cdot 898 + 5\cdot 55$	(31) $15\cdot 86176 + 41\frac{39}{40}$
(24) $29 + \cdot 61694$	(32) $1777\frac{9}{17} + 2\cdot 746$

**Ex. 38.***Reduction of Vulgar Fractions to Decimals.*

(1) Reduce to Decimals—

$$\frac{11}{16}, \frac{15}{24}, \frac{3}{40}, \frac{57}{64}, \frac{129}{128}, 3\frac{21}{575}.$$

(2) Reduce to approximate ten-thousandths—

$$\frac{5}{12}, \frac{11}{18}, \frac{5}{7}, \frac{1}{13}, \frac{11}{1460}, \frac{8}{497}.$$

(3) Reduce to approximate millionths—

$$\frac{21}{31}, \frac{3212}{789}, \frac{397}{4098}, \frac{11193}{1234}, \frac{18s. 6\frac{1}{4}d.}{£3 15s. 10d.}.$$

$$\frac{5 \text{ ac. } 33 \text{ per.}}{56 \text{ ac. } 2 \text{ ro. } 25 \text{ per.}}$$

(4) Reduce to circulating decimals—

$$a. \frac{2}{3}, \frac{9}{11}, \frac{5}{22}, \frac{18}{37}, \frac{29}{63}.$$

$$b. \frac{270}{271}, \frac{619}{1212}, \frac{335}{478}, \frac{79 \text{ yds. } 6 \text{ in.}}{2 \text{ fur. } 137 \text{ yds. } 2\frac{3}{4} \text{ ft.}};$$

$$\frac{£21 11s. 9d.}{£136\frac{2}{3}}$$

**Ex. 39.***Reduction of Circulating Decimals to Vulgar Fractions.*

Reduce to Vulgar Fractions in lowest terms—

- a.  $\cdot\dot{7}$ ;  $\cdot\dot{2}3$ ;  $\cdot\dot{1}5$ ;  $\cdot\dot{3}6$ ;  $\cdot\dot{4}0\dot{7}$ .
- b.  $\cdot\dot{0}13\dot{2}$ ;  $\cdot\dot{9}891\dot{5}$ ;  $\cdot\dot{0}325\dot{2}$ ;  $\cdot\dot{6}9230\dot{7}$ ;  $\cdot\dot{0}19060\dot{9}$ .
- c.  $\cdot\dot{7}4981\dot{5}$ ;  $\cdot\dot{1}234\dot{5}$ ;  $\cdot\dot{0}73232\dot{1}$ ;  $\cdot\dot{8}0870\dot{3}$ ;  $\cdot\dot{1}71428\dot{5}$ .

**Ex. 40.***Reduction of Concrete Fractions.*

Express—

- (1)  $2\cdot7$  shill. in pounds; and  $\pounds 0\cdot325$  in shill.
- (2)  $\cdot471$  of a penny in pounds; and  $\pounds 3\cdot456$  in pence.
- (3)  $\pounds 0\cdot171875$  in farth.; and  $23\cdot77$  half pence in pounds.
- (4)  $75\cdot34$  hf. crowns in pounds; and  $\cdot63$  of a hf. guin. in hf. crowns.
- (5)  $\cdot4375$  of a ton,  $3\cdot423$  lb.,  $15\cdot9413$  ounces, each in approximate millionths of a cwt. and then add them.
- (6)  $43\cdot1105$  ells,  $6\cdot725$  yds., and  $10\cdot2915$  inches each in feet; and then add them.

**Ex. 41.***Decimal Comparison of Concrete Quantities.*

What decimal is—

- (1)  $8\frac{3}{4}d.$  of  $9s. 4d.$  ?      (2)  $4s. 3d.$  of  $\pounds 1.$  ?
- (3)  $26s. 7\frac{1}{2}d.$  of  $\pounds 3 15s. 9d.$  ?
- (4)  $13$  hf. crs. of  $17$  hf. guins ?
- (5)  $3s. 6\frac{1}{2}d.$  of  $2s. 6d.$  ?      (6)  $\pounds 5 7s. 2\cdot04d.$  of  $33s.$  ?

- (7) 6s. 10d. of £1 ?      (8)  $10\frac{1}{4}$ d. of a guinea ?  
 (9)  $14\frac{1}{2}$  oz. av. of 1 cwt. ?  
 (10) 110 lb.  $7\frac{1}{2}$  oz. av. of 1 ton ?  
 (11) 3 bu. 3 pks. of 5 qu.  $3\frac{1}{3}$  bu. ?  
 (12) 7 yds.  $2\frac{1}{3}$  ft. of  $\frac{1}{2}$  a mile ?  
 (13)  $\frac{171}{41}$  ac. of  $175\frac{3}{4}$  sq. po. ?  
 (14)  $\cdot 28702\frac{1}{2}$  pint of  $4\frac{1}{2}$  gall. ?

**Ex. 42.***Integer Values of Concrete Decimals.*

Work out the values of—

- (1) £2·6875; £·984875; £·043625.  
 (2) £26·12291 $\frac{2}{3}$ ; £·8725; 13·07638 guin.  
 (3) ·09375 of 2s.; 3·2608 of 2s. 6d.; ·093 of £5.  
 (4) 4·00973 of 6s.  $1\frac{1}{2}$ d.; 30·567 $\frac{5}{9}$  of 10s. 6d.  
 (5) 4·89732 $\frac{1}{7}$  cwt.; 1·062109 $\frac{2}{3}$  lb. tr.; 3·4891015 $\frac{5}{8}$  days.

**Ex. 43.***Miscellaneous Examples in Decimals.*

- (1) Work out to the 6th place of decimals—

$$\frac{826}{999} \text{ of } 1234.$$

- (2) Find to six places the decimal value of—

$$\frac{8}{27} + \frac{7}{26} \quad \frac{6}{25} + \frac{5}{24} - \frac{4}{39}.$$

- (3) How many days make ·030137 of a common year ?

- (4) Find, by Practice, the value of 27·83 cwt. of iron, at £7 10s. 6d. per ton.

- (5) Find in decimal form the value of—

$$\frac{1}{16} - \frac{1}{88} + \frac{7}{83},$$

(6) If 3·965 oz. of gold be worth £15·21, what is the worth of ·3538 of a lb. ?

(7) Find the simple decimal value of—

$$\frac{14\frac{4}{7}}{29\frac{3}{8}} \text{ of } \frac{7}{32} - \frac{20951}{36}$$

(8) Calculate, by Practice, 9·281 ounces of gold at £3 13s. 8·7d. per ounce.

(9) If the worth of 8·93 ounces of silver be 44·18 shillings, what is the worth of 1 lb. 4 oz. 8·32 dwt. ?

(10) Reduce to decimals of a pound, and then add together, £5 17s. 5¼d., £7 3s. 10d., and 13s. 7¾d., retaining only three decimal places in the sum; then reduce the sum to £ s. d., and verify by comparing the result with the amount of the given quantities.

(11) If there are 1609·3 mètres in an English mile, what vulgar fraction of a mètre is a yard ?

(12) If  $\frac{2}{3}$  of ·3127 be worth 38·69, what fraction of 3·599 is worth  $417\frac{15}{32}$  ?

(13) What proper fraction, having for its numerator 529, is most nearly equal to ·68 ? and what, having for its denominator 529, is most nearly equal to ·293 ?

(14) What vulgar fraction of  $\frac{£102\cdot06}{185 \text{ guin.}}$  is equal to

$$\frac{29\cdot67 \text{ yards}}{494\cdot5 \text{ Eng. ells ?}}$$

(15) A father and his son, when one mile apart, set out to meet each other. The son walked at the rate of 115·626 yards per minute, and they met in  $7\cdot8\frac{1}{2}$  minutes. At what rate did the father walk ?

(16) By what must 15·706 be multiplied, that if the

multiplier be subtracted from the product, the 912th part of the remainder will be  $\cdot 005289$  ?

(17) The sum of two decimal quantities is equal to  $\frac{98}{88}$ , and their difference equal to  $\frac{85}{98}$ . Find each quantity to the 6th place of decimals.

(18) What length of journey do I propose to take, if when I shall have gone  $\cdot 304$  of it and  $\cdot 304$  of the rest of it, I shall have still  $75\cdot 69$  miles before me ?

(19) How many minute spaces is the minute hand of a watch in advance of the hour hand at  $10\cdot 38$  minutes past 9 ?

(20) A cistern has two supply pipes, A and B, and a discharge pipe, C. If the cistern were empty it could be filled by A alone in  $4\cdot 47$  hours, or by B alone in  $6\cdot 09$  hours ; but if the cistern were full, C alone could run off the whole in 5 hours. In what time would the empty cistern be filled by turning on A and C together ? and in what time thereafter would it be again empty by shutting A and opening B ?

#### EX. 44.

##### *Rates per Cent.*

(1) Calculate an agent's commission on  $\pounds 1413\ 10s.\ 10d.$  at  $3\frac{1}{2}$  per cent.

(2) How much are 5 per cent. of  $\pounds 135\ 15s.$  and  $5\frac{1}{2}$  per cent. of  $27s.\ 6d.$  ?

(3) Calculate a discount of 4 per cent. on  $\pounds 782\ 12s.\ 6d.$

(4) Find the brokerage on  $\pounds 1530\ 15s.$  at  $\frac{1}{8}$  per cent.

(5) How much are  $7\frac{1}{2}$  per cent. of 45 gal. 2 qts. 1 pt., and 16 per cent. of 78 lb.  $14\frac{2}{7}$  oz. avoird. ?

(6) A shopkeeper having bought an article for

23s. 4d. is obliged to sell it at a loss of  $11\frac{1}{4}$  per cent. : what does he get for it ?

(7) Brandy that cost 20s. 10d. a gallon is sold at a profit of 14 per cent. Find the selling price.

(8) Ten years ago the population of a town was 14652, and it is now  $8\frac{3}{4}$  per cent. larger. Required the present population.

(9) If there be 53.36 per cent. of lead in a mass of lead ore weighing 246 lb., what does the metal weigh ?

(10) If I sell for  $10\frac{1}{2}$ d. an article that cost me half a crown, what will be my loss per cent. ?

(11) How much per cent. on £147 14s. 2d. is £5 3s.  $4\frac{3}{4}$ d. ?

(12) If £38 16s. 3d. be gained by an outlay of £172 10s., what is the gain per cent. ?

(13) A merchant loses £1 17s.  $10\frac{1}{4}$ d. on a bill amounting to £15 6s. 3d. : what is his loss per cent. in point of trade ?

(14) A builder buys two lots of old bricks for £54, and sells them for £66 : what does he gain per cent. ?

(15) How much per cent. is 5s. 4d. in the pound ?

(16) A book published at 6s. 6d. is sold at a discount of 18 per cent. : how much is charged for 25 copies ?

(17) The amount of an invoice was £37 12s. 8d. ; but 5 per cent. discount was allowed for cash. Find the net amount.

(18) Ten years ago the population of a town was 26870, it is now 20950. Required the decrease per cent.

(19) If sugar bought at 31s. 6d. per cwt. be sold at  $4\frac{1}{2}$ d. a lb., what is the profit per cent. ?

(20) A person having bought 35 tons of iron at £7 15s. per ton, sells 16 tons at £9 16s., and the remainder at 9 guineas: what does he gain per cent.?

(21) Cheese bought at 10s. 5d. per stone of 14 lb. is sold at 10½d. per lb. Find the profit per cent.

(22) If bacon bought at 80s. 6d. a cwt. be sold at 11½d. a lb., what is gained per cent.?

(23) What would be the loss per cent. by selling 25 yards of flannel for 42s. from a piece measuring 78 yards, which cost 7 guineas?

(24) On what outlay will a gain of 8½ per cent. amount to £3 17s. 6⅓d.?

(25) To what amount must an agent do business that his commission at 2¼ per cent. may be £43 19s. 1d.?

(26) On what sum does a stockbroker's commission of ⅓ per cent. amount to £3 7s. 9d.?

(27) What did I pay for a pianoforte which I sold at a profit of 12½ per cent. for 40½ guineas?

(28) A score of bullocks are sold at a profit of 17½ per cent. for £22 6s. 8d. a head: what was the prime cost of the whole?

(29) If by selling tea at 3s. 5d. a pound 16⅓ per cent. is gained, what was the cost price?

(30) A parish contains three schools, attended respectively by 183, 97, and 84 children: what percentage of the whole number of children belongs to each school?

(31) The population of a town is 43605, which is 10¼ per cent. less than it was ten years ago: what was the former population?

(32) I have lost 6⅔ per cent. by selling pine-apples at 8½d. each: what was the prime cost per dozen?

(33) A coal merchant had on hand 63 tons of coal which he was enabled to sell at 28s. 4d. a ton, gaining thereby  $27\frac{1}{2}$  per cent. Find the prime cost of the whole quantity.

(34) If by selling an article for 6s. 9d. I should gain 8 per cent., for what must I sell it to gain 12 per cent.?

(35) If  $2\frac{1}{2}$  per cent. would be gained by selling tea at 3s. 4d.. a lb., what would be the gain or loss per cent. by selling it at 3s.?

(36) At what price per pair must blankets be sold to gain  $1\frac{5}{8}$  per cent., if selling them at 18s. would be at a loss of  $6\frac{3}{8}$  per cent.?

(37) If selling beef at 6s. 4d. the stone would be at a profit of  $9\frac{1}{3}$  per cent., at what price should it be sold to make  $12\frac{3}{4}$  per cent. profit?

(38) By selling sheep at 43s. 6d. a head  $8\frac{3}{4}$  per cent. is gained: what would have been gained or lost per cent. by selling them at £2 a head?

(39) I should gain 40 per cent. by selling a book at the rate of 48s. 9d. for 13 copies: what would be my gain per cent. if I sold it at the rate of 80s. per 25 copies?

(40) A and B each offered to buy of me a job lot of goods. By accepting A's offer of £7 14s. I shall lose  $3\frac{1}{4}$  per cent.; but by accepting B's offer the loss would be only  $1\frac{1}{4}$  per cent. How much does B offer?

(41) A fishmonger having bought a quantity of salmon at 1s. 6d. a lb., sells two-thirds of it at 1s. 10d., and the remainder at 1s. 7d. Required his gain per cent.

(42) A draper having bought a piece of silk containing 56 yards at 4s. 7d. a yard, sold it in two quantities,



viz., 42 yards at 5s. 5d., and the rest at such a price that his gain upon the whole was 15 per cent. At what rate did he sell the 14 yards?

(43) A wine merchant buys 96 gallons of rum at 14s. 7d. a gallon. If he sells 28 gallons of it at 16s. 6d., at what price must he sell the remainder, that his gain upon the whole may be 18 per cent.?

(44) If eggs cost me 11d. a dozen, how many should I give for a shilling to gain 19 per cent.?

(45) A furniture dealer paid £46 for 20 dozen chairs. He sold 137 of them at 4s. each; at what average rate did he sell the rest if he lost  $1\frac{1}{4}$  per cent. on the whole?

(46) A publican pays £3 for a barrel of stout containing 36 gallons, and sells the beer at 7d. a quart: what does he gain per cent. on his outlay, after allowing  $3\frac{1}{4}$  per cent. for waste?

(47) A.'s income is  $1\frac{5}{8}$  per cent. more than B.'s: how much per cent. is B.'s money less than A.'s?

(48) One circle is 1.72 per cent. smaller than another: how much per cent. is the second circle larger than the first?

### EX. 45.

#### *Simple Interest.*

Find the simple interest on—

	£	s.	d.					
(1)	57	15	10	for 3 years at 5	per cent.	per annum.		
(2)	134	13	9	„ 2	„	$4\frac{1}{2}$	„	„
(3)	820	19	$9\frac{1}{4}$	„ 4	„	3	„	„
(4)	57	1	8	„ 1	„	$3\frac{1}{4}$	„	„
(5)	269	11	$9\frac{1}{4}$	„ 5	„	4	„	„
(6)	172	15	10	„ $2\frac{1}{2}$	„	$4\frac{1}{2}$	„	„

	£	s.	d.				
(7)	981	8	8	for $1\frac{1}{2}$ years at 5 per cent. per annum.			
(8)	1278	11	8	„ 1 „	$4\frac{3}{4}$	„	„
(9)	121	11	$4\frac{1}{4}$	„ 2 „	$3\frac{3}{4}$	„	„
(10)	1164	9	$4\frac{1}{2}$	„ 3 „	$3\frac{1}{2}$	„	„
(11)	236	14	$4\frac{1}{4}$	„ 4 „	4	„	„
(12)	581	10	$7\frac{1}{2}$	„ $5\frac{1}{2}$ „	5	„	„
(13)	1256	2	3	„ $2\frac{3}{4}$ „	6	„	„
(14)	185	13	4	„ 5 „	$5\frac{1}{4}$	„	„
(15)	2096	15	0	„ $4\frac{1}{2}$ „	4	„	„
(16)	38	5	10	„ $3\frac{1}{4}$ „	5	„	„
(17)	147	6	$9\frac{1}{4}$	„ $4\frac{1}{8}$ „	3	„	„
(18)	70	5	7	„ 6 „	$2\frac{1}{2}$	„	„
(19)	389	13	0	„ $2\frac{2}{3}$ „	$3\frac{1}{4}$	„	„
(20)	732	13	4	„ $5\frac{5}{8}$ „	$2\frac{5}{8}$	„	„

Find the amount of—

	£	s.	d.				
(21)	4730	0	0	for 3 years at 6 per cent. per annum.			
(22)	649	16	0	„ $2\frac{1}{4}$ „	5	„	„
(23)	508	0	$7\frac{1}{2}$	„ 6 „	$3\frac{1}{8}$	„	„
(24)	96	19	6	„ 4 „	$4\frac{1}{2}$	„	„
(25)	1574	10	0	„ $2\frac{5}{8}$ „	$3\frac{1}{8}$	„	„

Find the simple interest on—

	£	s.	d.				
(26)	43	13	8	for 4 months at $2\frac{1}{2}$ per cent. per annum.			
(27)	1096	5	6	„ 3 „	6	„	„
(28)	437	18	4	„ 9 „	5	„	„
(29)	32	14	9	„ 5 „	$3\frac{1}{2}$	„	„
(30)	2590	12	6	„ 7 „	10	„	„

Find the amount of—

	£	s.	d.				
(31)	79	2	$9\frac{1}{4}$	for 8 months at 4 per cent. per annum.			
(32)	360	15	0	„ 10 „	$3\frac{1}{4}$	„	„

Find the simple interest on—

	£	s.	d.	
(33)	16	5	0	for 39 weeks at 5 per cent. per annum.
(34)	681	11	7	„ 16 „ 3 „ „
(35)	28	0	0	„ 9 „ 4½ „ „
(36)	144	9	10	„ 70 days at 2 „ „
(37)	1708	4	0	„ 133 „ 7½ „ „
(38)	1277	0	0	„ 292 „ 6¼ „ „
(39)	809	11	8	„ 344 „ 5¼ „ „
(40)	268	0	0	„ 268 „ 3¼ „ „

(41) What principal will bear £20 15s. 5½d. by simple interest in 3 years at 5 per cent ?

(42) The half-yearly dividend on a sum of 3 per cent. stock is £19 18s. Required the amount of stock.

(43) What sum lent at 4 per cent. per annum will produce £6 18s. 10d. in 3½ years ?

(44) At what rate per cent. per annum will £78 3s. 7½d. yield £7 16s. 4½d. in 4 years ?

(45) In what time will £3870 amount to £4489 4s. at 3½ per cent. per annum ?

(46) At what rate per cent. per annum will £1116 17s. 6d. amount to £1451 18s. 9d. in 6 years 8 months ?

(47) For how many months must £12 15s. 5d. be lent that the interest at 2¼ per cent. per annum may be 2s. 11½d. ?

(48) How long must £1724 0s. 4d. be allowed to bear interest at 3½ per cent. per annum, that the amount may be £1747 12s. 8d. ?

(49) What sum must be lent at simple interest at 5 per cent. per annum to amount to £768 10s. 1d. in 3 years ?

(50) What principal will amount to £80 9s. 9d., by simple interest, in 3 years 3 months, at  $3\frac{1}{8}$  per cent. per annum?

(51) Find the principal which, being improved at  $4\frac{1}{2}$  per cent. per annum, simple interest, will amount to £334 15s. 2-85d. in 11 months.

(52) What principal will amount to £214 18s. in 85 days, at 4 per cent. per annum, simple interest?

### Ex. 46.

#### *Compound Interest.*

Find the amount, by compound interest, of—

	£	s.	d.	
(1)	265	0	0	in 2 years, at 5 per cent. per annum.
(2)	326	10	0	„ 2 „ 2 „ „
(3)	83	12	6	„ 3 „ $2\frac{1}{2}$ „ „
(4)	194	15	0	„ 2 „ 4 „ „
(5)	46	14	3	„ 2 „ 3 „ „
(6)	3870	0	0	„ 3 „ $4\frac{1}{2}$ „ „
(7)	522	13	6	„ 3 „ $3\frac{1}{2}$ „ „
(8)	1075	0	0	„ 3 „ $3\frac{1}{4}$ „ „

Find the compound interest on—

	£	s.	d.	
(9)	756	11	2	for 3 years at 3 per cent. per annum.
(10)	2463	6	10	„ 4 „ $2\frac{1}{4}$ „ „
(11)	392	18	7	„ 4 „ $3\frac{3}{4}$ „ „
(12)	667	14	0	„ 4 „ $4\frac{1}{4}$ „ „

**Ex. 47.***True Discount and Present Worth.*

Find the true discount on—

	£	s.	d.	
(1)	1403	0	0	due 3 years hence, at 5 per cent. per ann.
(2)	24	10	11	„ $2\frac{1}{2}$ „ „ 3 „ „
(3)	753	19	0	„ $1\frac{1}{4}$ „ „ 6 „ „
(4)	1000	0	0	„ 4 „ „ $3\frac{1}{2}$ „ „
(5)	610	17	4	„ $3\frac{3}{4}$ „ „ $2\frac{1}{2}$ „ „
(6)	71	16	$6\frac{1}{2}$	„ 8 months „ $5\frac{1}{4}$ „ „
(7)	17	9	$3\frac{1}{2}$	„ 9 „ „ 5 „ „
(8)	290	0	0	„ 10 „ „ $3\frac{1}{4}$ „ „

Find the true present worth of—

	£	s.	d.	
(9)	43	13	0	due 2 yrs. hence, at $6\frac{1}{2}$ per c. per ann.
(10)	144	3	3	„ $1\frac{3}{4}$ „ „ 8 „ „
(11)	700	0	0	„ 4 months „ $2\frac{2}{5}$ „ „
(12)	29	4	0	„ 5 „ „ $3\frac{1}{3}$ „ „
(13)	14	4	11	„ 128 days „ $2\frac{1}{8}$ „ „
(14)	42	14	3	„ 75 „ „ $4\frac{2}{3}$ „ „
(15)	462	8	7	„ 236 „ „ $7\frac{1}{2}$ „ „

**Ex. 48.***Mercantile Discount.*

(1) What is the mercantile present worth of £317 18s. 4d. payable 2 years hence, the rate of interest being 4 per cent.?

(2) Find the practical discount on £153 16s. 10d., payable 3 months hence, interest being at  $3\frac{1}{2}$  per cent.

(3) Calculate the true discount, and also the reputed discount, on £232, payable 10 months hence, interest being at  $3\frac{1}{4}$  per cent.

(4) A bill for £213 16s. 6d., drawn on September 27 at 2 months' date, was discounted at 5 per cent. on October 10. Required the cash proceeds, allowing the customary three days of grace.

(5) What sum of discount will a banker charge for cashing a bill on June 1 at 4 per cent., the bill having been drawn on May 9, at 3 months date, for £59 17s., allowing the three days' grace?

(6) An acceptance for £515, dated December 17, at 1 month, was discounted at 6 per cent. on December 26. Find the cash proceeds, taking into account the three days' grace.

#### Ex. 49.

##### *Distributive Proportion.*

(1) Divide the number 105 into three parts in the proportion of 5, 7, 9.

(2) The number 27 is to be divided into three parts in the proportion of 8, 7, 3. Find the parts.

(3) A guinea is to be divided among three children in the proportion of their ages, which are 7,  $9\frac{1}{2}$ , and  $11\frac{1}{2}$  years: what will each receive?

(4) Four commercial partners are to divide among them a net profit in proportion to their capitals, which are £890, £800, £735, £700: how much per cent. of the profit will each receive?

(5) Divide £100 between A and B so that B's share may be equal to  $\frac{5}{7}$  of A's.

(6) Two numbers together make up 162, and one of

them contains 14 as often as the other contains 13. Find the numbers.

(7) How many acres are in each of three fields, the first containing 5 acres as often as the second contains 2, and the second containing 7 acres as often as the third contains 4, the whole extent of the three fields being  $14\frac{1}{2}$  acres?

(8) The sum of £1000 was divided among three sisters, giving £8 to the first as often as £7 to the second, and £6 to the second as often as £5 to the third. Find the share of each.

(9) A debt of £19 12s. was paid with equal numbers of sovereigns, half-crowns, and florins: how many were there of each coin?

(10) Divide £461 12s. among three persons, giving the second 5 per cent. more than the first, and the third 7 per cent. more than the second.

(11) Three numbers give equal products when multiplied by 7, 9, and 12 respectively; the sum of the numbers is 1105. Find each of them.

(12) Find four sums of money yielding the same amount of annual interest at the respective rates of 3,  $3\frac{1}{2}$ ,  $4\frac{1}{2}$ , and 5 per cent., the greatest sum exceeding the least by 14 guineas.

### EX. 50.

#### *Square Root.*

Extract the square root of—

- |            |            |             |
|------------|------------|-------------|
| (1) 729.   | (2) 961.   | (3) 2025.   |
| (4) 5329.  | (5) 8281.  | (6) 16384.  |
| (7) 43681. | (8) 34969. | (9) 351649. |

- (37)  $9\frac{1}{4}$  hrs.  $\times 18 : 9$  hrs.  $\times 26 :: 6$  m. : 8 m. *Ans.*
- (38) £340 17s. 6d. : £1 :: £5 13s. 7 $\frac{1}{2}$ d. : 4d. *Ans.*
- (39) 27 bales of 375 lb. each reduced to bales of 324 lb.  
 each is  $\frac{375 \times 27}{324}$  bales =  $31\frac{1}{4}$  bales;  
 3555s. : 2844s. ::  $31\frac{1}{4}$  ba. : 25 ba. *Ans.*
- (40) In 8 min. 24 sec. the quantity supplied is  $67\frac{1}{2}$  gall.;  
 and we are to find the time for 101 gall. to  
 be supplied:  
 $67\frac{1}{2} : 101 :: 504$  sec. :  $754\frac{2}{15}$  sec. = 12 min.  $34\frac{2}{15}$  sec.  
*Ans.*
- (41) 112 lb. gross is reduced to  $94\frac{1}{2}$  lb. net; or the net  
 weight is to the gross as 27 to 32:  
 $27 : 32 :: 13$  cwt. 29 lb. : 15 cwt. 80 lb. *Ans.*
- (42) Given, that 54 men take  $8\frac{1}{2}$  hrs.  $\times 12$ , or 105 hrs.:  
 to find, first, how many hours 42 men would take.  
 $42 : 54 :: 105$  hrs. : 135 hrs. work in the 15 days;  
 $135$  hrs.  $\div 15 = 9$  hrs. *Ans.*
- (43) A bushel of oats weighs  $1050$  lb.  $\div 28 = 37\frac{1}{2}$  lb.;  
 " " barley "  $1356\frac{1}{2} \div 27 = 50\frac{1}{4}$  lb.;  
 $50\frac{1}{4} : 37\frac{1}{2} :: 268$  of oats : 200 of barley. *Ans.*
- (44) £1 or 240d. gross is reduced to 233d. net;  
 $233d. : £2818$  16s.  $3\frac{1}{2}d. :: £1 : £2903$  10s. *Ans.*
- (45) Wt. of 1 bu. of oats,  $693 + 18 = 38\frac{1}{2}$  lb.;  
 " " wheat,  $840 + 14 = 60$  lb.;  
 $60 : 38\frac{1}{2} :: 150$  lb. :  $96\frac{1}{4}$  lb. *Ans.*
- (46) Wt. of a foot of cast iron =  $6533$  lb.  $\div 15$ ;  
 " " wrought =  $8131$  lb.  $\div 17$ ;  
 $\frac{6131}{17} : \frac{6533}{15} :: 5709$  cub. in. :  $5198\frac{3}{5}$  c. in.  
 = 3 cub. ft.  $14\frac{3}{5}$  in. *Ans.*



- (47) Wt. of 1 ft. copper = 7521 lb. + 14;  
 " " lead = 25615 lb. + 36;  
 $\frac{25615}{98} : \frac{7521}{14} :: 423 \text{ lb.} : 2 \text{ cwt. } 3 \text{ qrs. } 11\frac{13}{35} \text{ lb.}$  *Ans.*
- (48) The 2nd youth gains 1100 yds. per hour on the 1st,  
 and has to gain  $\frac{1}{3}$  of 3 mi. 660 yds., or 1980 yds.,  
 in all :  
 $1100 : 1980 :: 1 \text{ hr.} : 1 \text{ hr. } 48 \text{ min.}$  *Ans.*
- (49) The 1st train runs 14 miles in  $\frac{14}{34}$  of an hour =  
 35 min.; the 2nd runs 14 miles in 13 - 10, or 3  
 min. less than the 1st, viz. in 32 min.; hence,  
 $32 : 35 :: 24 \text{ mi.} : 26\frac{1}{4} \text{ mi.}$  *Ans.*
- (50) From 2 o'clock to 12 min. past 6 are 4 hrs.  
 12 min.;  $27 : 21 :: 4 \text{ hrs. } 12 \text{ min.} : 3 \text{ hrs. } 16 \text{ min.}$ ,  
 the time in which the 2nd train can perform the  
 required journey; hence 6 h. 12 m. - 3 h. 16 m.  
 = 2 h. 56 m., or 56 min. past 2. *Ans.*
- (51)  $17s. 4d. . 16s. 8d. :: 8 \text{ pts.} \times 13\frac{1}{4} : 101\frac{1}{4} \text{ pts.}$  to be  
 sold; hence  $108 - 101\frac{1}{4} = 6\frac{3}{4} \text{ pts. reserved.}$  *Ans.*

**Ex. 20.**

$\pounds$	s.	d.	$\pounds$	s.	d.	$\pounds$	s.	d.
(1) 4	4	4	(2) 1	3	4	(3) 14	0	3
1	0	0	0	16	3	6	5	$6\frac{1}{2}$
0	9	4	0	9	4	1	1	$11\frac{1}{4}$
0	5	10	0	3	3	0	17	$0\frac{1}{4}$
1	9	3	0	2	4	<hr/>		
<hr/>			<hr/>			£22	4	9
£7	8	9	£2	14	6			

(4) £15 15s. 0d.

6	18	0
13	5	0
6	8	0
1	16	9
1	7	6
0	15	9
<hr/>		
£46	6	0

(5) 11s. 8d.

6	4 $\frac{1}{2}$
7	11
4	0
3	4
4	10 $\frac{1}{2}$
2	7 $\frac{1}{2}$
1	5 $\frac{1}{2}$
6	8 $\frac{1}{4}$
<hr/>	
£2	8 11 $\frac{1}{4}$

(6) £1 10s. 3d.

0	5	6
0	9	4 $\frac{1}{2}$
0	5	4 $\frac{1}{2}$
0	5	4
0	10	0 $\frac{1}{4}$
0	1	9
<hr/>		
£3	7	8

(7) 7s. 1 $\frac{1}{2}$ d.

4	1 $\frac{1}{2}$
1	7 $\frac{1}{4}$
2	10
1	4
2	4
<hr/>	
19s.	4 $\frac{1}{4}$ d.

(8) 10s. 9 $\frac{1}{2}$ d.

3	1 $\frac{1}{2}$
7	2 $\frac{1}{2}$
5	1 $\frac{3}{4}$
3	4
<hr/>	
£1	9 7 $\frac{1}{4}$

(9) 7s. 4 $\frac{1}{2}$ d.

5	6 $\frac{1}{4}$
9	6 $\frac{1}{2}$
5	3
2	10 $\frac{1}{2}$
<hr/>	
£1	10 6 $\frac{1}{2}$

(10) 13s. 3 $\frac{1}{2}$ d.

8	5
5	1 $\frac{1}{2}$
1	1 $\frac{1}{2}$
<hr/>	
£1	7 11 $\frac{1}{4}$

(11) 6 $\frac{1}{2}$  lb. tea

at 3s. 4d.

... £1 1 8

7 coffee

at 1 5

... 0 9 11

9 loaf sugar

at 0 5 $\frac{1}{2}$ ... 0 4 1 $\frac{1}{2}$ 

11 moist do.

at 0 3 $\frac{1}{2}$ ... 0 3 2 $\frac{1}{2}$ 

9 biscuit

at 0 9

... 0 6 9

£2 5 8

(12) £1 15s. 6d.

0	9	6 $\frac{3}{4}$
0	3	0 $\frac{1}{2}$
0	5	1 $\frac{1}{4}$
0	3	2 $\frac{1}{4}$
<hr/>		
£2	16	5 $\frac{1}{4}$

(13) 9 lb. 5 oz. at 10d.

... £0 7 9

10 15

at 11 $\frac{1}{2}$ d. ... 0 10 5 $\frac{1}{2}$ 

11 7

at 8 $\frac{1}{2}$ d. ... 0 8 1 $\frac{1}{4}$ 

£1 6 4

## PART III.

## Ex. 21.

- (1)  $\left. \begin{array}{l} 8 : 9 \\ 21 : 32 \end{array} \right\} :: 2030 \text{ lb.} : 3480 \text{ lb.} \quad \text{Ans.}$
- (2)  $\left. \begin{array}{l} 245 : 343 \\ 21 : 10 \end{array} \right\} :: 9 \text{ hrs.} : 6 \text{ hrs.} \quad \text{Ans.}$
- (3)  $\left. \begin{array}{l} \cdot 6 \quad 15 \\ 527 : 217 \end{array} \right\} :: 16 \text{ da.} : 16\frac{5}{17} \text{ da.} \quad \text{Ans.}$
- (4)  $\left. \begin{array}{l} 27 : 21 \\ 10 : 15 \end{array} \right\} :: 9 \text{ hrs.} : 10\frac{1}{2} \text{ hrs.} \quad \text{Ans.}$
- (5)  $\left. \begin{array}{l} 540 : 480 \\ 8 : 5 \end{array} \right\} :: £12 : £6 \text{ } 13s. \text{ } 4d. \quad \text{Ans.}$
- (6)  $\left. \begin{array}{l} 9 : 7 \\ 14 : 17 \end{array} \right\} :: 16 \text{ ac.} : 15 \text{ ac. } 17\frac{7}{8} \text{ per.} \quad \text{Ans.}$
- (7)  $\left. \begin{array}{l} 4 \cdot 3 \\ 52 : 65 \end{array} \right\} :: 2 \text{ hrs. } 32 \text{ min.} : 2 \text{ hrs. } 22\frac{1}{2} \text{ min.} \quad \text{Ans.}$
- (8)  $\left. \begin{array}{l} 5 : 8 \\ 9440 : 4425 \end{array} \right\} :: 16 \text{ pers.} : 12 \text{ pers.} \quad \text{Ans.}$
- (9)  $\left. \begin{array}{l} 1541 : 2546 \\ 252 : 184 \end{array} \right\} :: 63 \text{ da.} : 76 \text{ da.} \quad \text{Ans.}$
- (10)  $\left. \begin{array}{l} 5\frac{1}{4} : 5 \\ 30 \text{ bu.} : 25 \text{ bu.} \end{array} \right\} :: 6s. \text{ } 6\frac{1}{4}d. : 5s. \text{ } 2\frac{1}{2}d. \quad \text{Ans.}$
- (11)  $\left. \begin{array}{l} 35 : 42 \\ 6612 : 3538 \end{array} \right\} :: £629 \text{ } 7s. \text{ } 6d. : £404 \text{ } 2s. \text{ } 6d. \quad \text{Ans.}$
- (12)  $\left. \begin{array}{l} 6 : 9 \\ 39 : 38 \\ 9\frac{1}{2} : 10 \end{array} \right\} :: 2290 \text{ yds.} : 3523\frac{1}{3} \text{ yds.} \quad \text{Ans.}$

$$(13) \left. \begin{array}{l} 5 : 4\frac{1}{2} \\ 3 : 3\frac{3}{4} \\ 15 : 21 \\ 13\frac{1}{2} : 10 \end{array} \right\} :: 108 \text{ yds.} : 119 \text{ yds. } \textit{Ans.}$$

$$(14) \left. \begin{array}{l} 14 : 18 \\ 76 : 91 \\ 52 : 57 \\ 54 : 45 \\ 3 : 4 \end{array} \right\} :: 12 \text{ hrs.} : 22\frac{1}{2} \text{ hrs. } \textit{Ans.}$$

$$(15) \left. \begin{array}{l} 17 : 24 \\ 12 \times 20 : 11 \times 21 \\ 56 : 51 \end{array} \right\} :: £4 \text{ } 13s. \text{ } 4d. : £5 \text{ } 15s. \text{ } 6d. \textit{Ans.}$$

$$(16) \left. \begin{array}{l} 87\frac{1}{2} : 116 \\ 4 : 4\frac{1}{2} \\ 4 : 3\frac{3}{4} \\ 348 : 300 \end{array} \right\} :: 28 \text{ pion.} : 27 \text{ pion. } \textit{Ans.}$$

$$(17) \left. \begin{array}{l} 9 : 12 \\ 55 : 76 \\ 117 : 5\frac{1}{2} \end{array} \right\} :: 6\frac{1}{2} \text{ hrs.} : 33\frac{7}{9} \text{ min. } \textit{Ans.}$$

$$(18) \left. \begin{array}{l} 2 : 2\frac{1}{4} \\ 4 : 3 \\ 9 : 8 \end{array} \right\} :: 5 \text{ hrs.} : 3\frac{3}{4} \text{ hrs. } \textit{Ans.}$$

**Ex. 22.**

- |              |               |               |            |           |
|--------------|---------------|---------------|------------|-----------|
| (1) 72.      | (2) 120.      | (3) 144.      | (4) 1638.  | (5) 3220. |
| (6) 2520.    | (7) 1050.     | (8) 4368.     | (9) 11880. |           |
| (10) 28080.  | (11) 10080.   | (12) 15120.   |            |           |
| (13) 18360.  | (14) 21420.   | (15) 31920.   |            |           |
| (16) 440910. | (17) 1668618. | (18) 6444438. |            |           |

**Ex. 23.**

- (1)  $2\frac{2}{3}, 2\frac{2}{3}, 7.$  (2)  $1, 5, 3\frac{10}{11}.$   
 (3)  $13\frac{5}{19}, 14\frac{15}{16}, 23.$  (4)  $1\frac{1}{11}, 35, 18\frac{6}{7}.$   
 (5)  $\frac{47}{5}, \frac{94}{7}, \frac{13}{1}.$  (6)  $\frac{121}{4}, \frac{71}{12}, \frac{2830}{23}.$   
 (7)  $\frac{25}{1}, \frac{200}{17}, \frac{199}{14}.$  (8)  $\frac{2000}{33}, \frac{4998}{101}, \frac{648}{25}.$

**Ex. 24.**

- (1)  $\frac{15}{24}, \frac{14}{24}.$  (2)  $\frac{45}{120}, \frac{20}{120}, \frac{84}{120}.$  (3)  $\frac{8}{36}, \frac{30}{36}, \frac{27}{36}.$   
 (4)  $\frac{44}{84}, \frac{57}{84}.$  (5)  $\frac{88}{108}, \frac{77}{108}, \frac{102}{108}.$  (6)  $\frac{156}{168}, \frac{35}{168}, \frac{88}{168}.$   
 (7)  $\frac{5}{75}, \frac{12}{75}.$  (8)  $\frac{768}{360}, \frac{848}{360}, \frac{1340}{360}.$  (9)  $\frac{2800}{3600}, \frac{1575}{3600}, \frac{1008}{3600}.$   
 (10)  $\frac{27}{270}, \frac{18}{270}, \frac{18}{270}, \frac{10}{270}.$  (11)  $\frac{225}{2340}, \frac{715}{2340}, \frac{504}{2340}, \frac{2262}{2340}.$

**Ex. 25.**

- (1)  $1\frac{13}{26}.$  (2)  $1\frac{49}{72}.$  (3)  $11\frac{11}{14}.$  (4)  $1\frac{2}{3}.$  (5)  $\frac{2}{5}.$   
 (6)  $2\frac{79}{144}.$  (7)  $2.$  (8)  $27\frac{7}{9}.$  (9)  $\frac{829}{936}.$  (10)  $12\frac{1}{48}.$   
 (11)  $15\frac{4181}{5608}.$  (12)  $8\frac{25}{396}.$  (13)  $\frac{157}{132}.$  (14)  $\frac{73}{465}.$   
 (15)  $\frac{51889}{57072}.$  (16)  $\frac{198281}{332840}.$

**Ex. 26.**

- (1)  $\frac{7}{36}.$  (2)  $\frac{2}{75}.$  (3)  $\frac{11}{24}.$  (4)  $4\frac{5}{9}.$   
 (5)  $\frac{53}{352}.$  (6)  $\frac{19}{168}.$  (7)  $19\frac{31}{48}.$  (8)  $\frac{119}{1296}.$   
 (9)  $\frac{9}{20}.$  (10)  $5\frac{34}{819}.$  (11)  $2\frac{97}{100}.$  (12)  $\frac{195}{224}.$   
 (13)  $55\frac{51}{58}.$  (14)  $\frac{403}{1300}.$  (15)  $4\frac{17}{36} - \frac{11}{36} = 4\frac{1}{6}.$  (16)  $4\frac{181}{315}.$   
 (17)  $\frac{8}{845} + \frac{28}{255} - \frac{3}{17} + \frac{1}{23} = \frac{8+15}{845} + \frac{28-45}{255} = \frac{1}{15} - \frac{1}{15} = 0.$

*Ans.*

- (18)  $1\frac{600}{602} - \frac{355}{602} + \frac{30}{378} - \frac{35}{378} = 1\frac{5}{14} - \frac{5}{378} = 1\frac{65}{189}.$  *Ans.*

**Ex. 27.**

- (1)  $\frac{10}{27}.$  (2)  $\frac{21}{50}.$  (3)  $\frac{35}{117}.$  (4)  $\frac{25}{28}.$   
 (5)  $\frac{27}{77}.$  (6)  $\frac{17}{65}.$  (7)  $\frac{3}{80}.$  (8)  $12\frac{26}{55}.$

- (9)  $42\frac{6}{7}$ . (10)  $42\frac{3}{4}$ . (11)  $\frac{12}{245}$ . (12)  $\frac{112}{135}$ .  
 (13) 19000. (14)  $44066\frac{2}{3}$ . (15)  $50084\frac{5}{9}$ .  
 (16)  $54388\frac{8}{27}$ . (17)  $12345\frac{5}{7}$ .  
 (18)  $107195\frac{1}{3}$ . (19)  $\frac{16}{35}$ . (20)  $282\frac{2}{27}$ .

**Ex. 28.**

- (1)  $\frac{20}{21}$ . (2)  $1\frac{7}{9}$ . (3)  $\frac{3}{4}$ . (4)  $2\frac{9}{20}$ .  
 (5)  $3\frac{1}{5}$ . (6)  $\frac{170}{171}$ . (7)  $\frac{2}{83}$ . (8)  $13\frac{1}{8}$ .  
 (9)  $2\frac{2}{7}$ . (10)  $\frac{9}{49}$ . (11)  $1\frac{1}{16}$ . (12)  $\frac{102}{455}$ .  
 (13) 27. (14)  $1\frac{13}{41}$ . (15)  $6\frac{10}{51}$ . (16)  $1\frac{19}{50}$ .  
 (17)  $\frac{13}{56} \times \frac{40 \times 49}{11 \times 39} = \frac{5 \times 7}{33} = 1\frac{2}{33}$ . *Ans.* (18)  $\frac{299}{480}$ .  
 (19)  $1254\frac{537}{685}$ . (20)  $\frac{487129}{13 \times 23} \times \frac{23 \times 23}{9052} = 95\frac{339}{1612}$  *Ans.*

**Ex. 29.**

- (1)  $\frac{27 \times 8}{405} = \frac{8}{15}$ . *Ans.* (2)  $\frac{207 \times 15}{184 \times 25} = \frac{9 \times 3}{8 \times 5} = \frac{27}{40}$ . *Ans.*  
 (3)  $\frac{5}{12} \times \frac{912 \times 21}{190 \times 17} = \frac{5}{4} \times \frac{48 \times 7}{10 \times 17} = 2\frac{8}{17}$ . *Ans.*  
 (4)  $\frac{5 \times 11}{122 \times 3} \times \frac{305 \times 19}{341 \times 18} = \frac{5 \times 19 \times 5}{31 \times 18 \times 6} = \frac{475}{3348}$ . *Ans.*  
 (5)  $\frac{133}{24} + \frac{133}{15} = \frac{3}{8}$ . *Ans.*  
 (6)  $\frac{9 \times 15\frac{8}{10}}{1 + \frac{63}{8}} = \frac{9 \times 153}{10 + 126} = \frac{9 \times 9}{8} = 10\frac{1}{8}$ . *Ans.*  
 (7)  $6 + \frac{5\frac{1}{3}}{48 + 1} - 5 + \frac{3\frac{1}{4}}{13 + 1} = 1 + \frac{16}{147} + \frac{13}{56} = 1\frac{401}{1176}$  *Ans.*  
 (8)  $\frac{\frac{29}{22} \times (\frac{3}{35} + \frac{11}{45} + \frac{14}{81}) \times 12}{217 - 7\frac{3}{4} \times 5} = \frac{\frac{29}{22} \times \frac{1426}{2835} \times 3}{217 - 38\frac{3}{4}}$   
 $= \frac{29 \times \frac{62}{243} \times 4}{713} = \frac{116}{22} \times \frac{2}{243} = \frac{232}{21735}$ . *Ans.*

## Ex. 30.

- (1)  $\frac{2}{5}$  of  $\pounds \frac{1}{20} = \pounds \frac{1}{50}$ . *Ans.* (2)  $\frac{2}{105}$  of 20s. =  $\frac{8}{21}$ s. *Ans.*  
 (3)  $\frac{8}{9}$  of  $\pounds \frac{1}{240} = \pounds \frac{1}{270}$ . *Ans.* (4)  $\frac{7}{15}$  of 240d. = 112d. *Ans.*  
 (5)  $\frac{7}{2}$  of  $\frac{1}{12}$ s. =  $\frac{7}{24}$ s. *Ans.* (6)  $\frac{21}{2}$  of  $\pounds \frac{1}{20} = \pounds \frac{21}{40}$ . *Ans.*  
 (7)  $\frac{5}{7}$  of 20s. =  $14\frac{2}{7}$ s. *Ans.* (8)  $\frac{7}{18}$  of 240d. =  $93\frac{1}{3}$ d. *Ans.*  
 (9)  $\frac{9}{25}$  of 480 hf. d. =  $172\frac{4}{5}$  hf. d. *Ans.*  
 (10)  $\frac{1}{1000}$  of 960 farth. =  $\frac{24}{25}$  farth. *Ans.*  
 (11)  $\frac{255}{4}$  of  $\pounds \frac{1}{240} = \pounds \frac{17}{64}$ . *Ans.* (12)  $\frac{63}{2}$  of  $\frac{1}{12}$ s. =  $2\frac{3}{8}$ s. *Ans.*  
 (13)  $\frac{8}{27}$  of  $\frac{1}{21}$  guin. =  $\frac{8}{567}$  guin. *Ans.*  
 (14)  $\frac{1}{384}$  of 252d. =  $\frac{9}{13}$ d. *Ans.*  
 (15)  $\frac{5}{13}$  of  $\pounds \frac{21}{20} = \pounds \frac{21}{52}$ . *Ans.*  
 (16)  $\frac{5}{16}$  of  $\frac{20}{21}$  guin. =  $\frac{25}{84}$  guin. *Ans.*  
 (17)  $\frac{5}{8}$  of  $\frac{10}{21}$  hf. guin. =  $\frac{25}{84}$  hf. guin. *Ans.*  
 (18)  $\frac{231}{4}$  of  $\frac{1}{252}$  guin. =  $\frac{11}{48}$  guin. *Ans.*  
 (19)  $\frac{15}{25}$  of  $\frac{1}{20}$  ton =  $\frac{9}{250}$  ton. *Ans.*  
 (20)  $\frac{5}{21}$  of 112 lb. =  $26\frac{2}{3}$  lb. *Ans.*  
 (21) 36 times  $\frac{1}{112}$  cwt. =  $\frac{9}{28}$  cwt. *Ans.*  
 (22)  $\frac{490}{9}$  of  $\frac{1}{2240}$  ton. =  $\frac{7}{288}$  ton. *Ans.*  
 (23)  $\frac{21}{10}$  of  $\frac{1}{28 \times 16}$  qr. =  $\frac{3}{640}$  qr. *Ans.*  
 (24)  $\frac{35}{36}$  of  $\frac{8}{45}$  of 112 times 16 oz. =  $284\frac{4}{9}$  oz. *Ans.*  
 (25)  $\frac{9}{200}$  of 12 oz. =  $\frac{27}{50}$  oz. *Ans.*  
 (26)  $\frac{17}{96}$  of  $24 \times 20$  grs. = 85 grs. *Ans.*  
 (27) 198 times  $\frac{1}{8 \times 220}$  furl. =  $\frac{9}{10}$  furl. *Ans.*  
 (28)  $\frac{27}{5}$  of  $\frac{1}{36}$  yd. =  $\frac{3}{20}$  yd. *Ans.*  
 (29)  $\frac{8}{75}$  of 160 sq. po. =  $17\frac{1}{15}$  sq. po. *Ans.*  
 (30)  $\frac{9}{55}$  of  $40 \times 30\frac{1}{4}$  sq. yds. = 198 sq. yds. *Ans.*  
 (31)  $\frac{729}{5}$  of  $\frac{1}{4840}$  ac. =  $\frac{3}{100}$  ac. *Ans.*  
 (32)  $\frac{12}{25}$  of  $\frac{35 \times 7}{48 \times 6}$  of  $60 \times 24$  min. = 588 min. *Ans.*

## Ex. 31.

- (1)  $2\frac{1}{4}d. + 2s. 6d. = 9 + 120 = \frac{5}{40}. \text{ Ans.}$   
 (2)  $45d. + 63d. = 5 + 7 = \frac{5}{7}. \text{ Ans.}$   
 (3)  $202\frac{1}{2}d. + 90d. = 405 + 180 = \frac{9}{4}. \text{ Ans.}$   
 (4)  $109\frac{1}{4}s. + 256\frac{1}{2}s. = 437 + 1026 = \frac{23}{54}. \text{ Ans.}$   
 (5)  $\frac{5}{78} \text{ of } 20s. + \frac{56}{85}s. = 500 + 336 = \frac{125}{84}. \text{ Ans.}$   
 (6)  $164\frac{4}{9}d. + 918\frac{5}{6}d. = 2960 + 16539 = \frac{80}{447}. \text{ Ans.}$   
 (7)  $252d. \times 11\frac{1}{4} + 1622\frac{1}{2}d. = 252 \times 5 + 6480 = \frac{180}{103}. \text{ Ans.}$   
 (8)  $30\frac{2}{3} \text{ in.} + 122\frac{2}{3} \text{ in.} = \frac{272 \times 5}{612 \times 9} = \frac{20}{81}. \text{ Ans.}$   
 (9)  $203 \text{ lb.} + 8642 \text{ lb.} = \frac{7}{298}. \text{ Ans.}$   
 (10)  $35\frac{1}{2} \text{ sq. yds.} + (30\frac{1}{4} \text{ sq. yds.} \times 416)$   
 $= \frac{176 \times 4}{2080 \times 121} = \frac{2}{715}. \text{ Ans.}$

## Ex. 32.

- (1)  $\frac{2}{7} \text{ of } 12d. = 24d. + 7 = 3\frac{3}{7}d. \text{ Ans.}$   
 (2)  $\frac{5}{9} \text{ of } 20s. = 100s. + 9 = 11s. 1\frac{1}{3}d. \text{ Ans.}$   
 (3)  $\frac{7}{12} \text{ of } 20s. = 140s. + 12 = 11s. 8d. \text{ Ans.}$   
 (4)  $\pounds 2 + \frac{11}{28} \text{ of } 20s. = \pounds 2 + 220s. + 28 = \pounds 2 7s. 10\frac{2}{7}d. \text{ Ans.}$   
 (5)  $\frac{5}{12} \text{ of } 2s. 6d. = 12s. 6d. + 12 = 1s. 0\frac{1}{2}d. \text{ Ans.}$   
 (6)  $\frac{7}{8} \text{ of } 21s. = 147s. + 8 = 18s. 4\frac{1}{2}d. \text{ Ans.}$   
 (7)  $\frac{9}{16} \text{ of } 2s. = 18s. + 16 = 1s. 1\frac{1}{2}d. \text{ Ans.}$   
 (8)  $\frac{15}{86} \text{ of } 21s. = 45s. + 8 = 5s. 7\frac{1}{2}d. \text{ Ans.}$   
 (9)  $\frac{46}{87} \text{ of } \frac{24}{7} \text{ of } \frac{703}{4}d. = \frac{46 \times 8}{7} \text{ of } \frac{87}{4}d. = 486\frac{2}{7}d. = 40s. 6\frac{2}{7}d. \text{ Ans.}$   
 (10)  $\frac{7}{11} \text{ of } \frac{23}{48} \text{ of } 35\frac{3}{4}s. = \frac{13}{4}s. \times \frac{23 \times 7}{45} = 46s. 6\frac{2}{15}d. \text{ Ans.}$   
 (11)  $\frac{11}{18} \text{ of } 112 \text{ lb.} = \frac{816}{9} \text{ lb.} = 68 \text{ lb. } 7\frac{1}{3} \text{ oz. } \text{ Ans.}$   
 (12)  $2 \text{ tons} + \frac{128}{365} \text{ of } 20 \text{ cwt.} = 2 \text{ t. } 7 \text{ cwt. } 1 \text{ lb. } 8\frac{40}{73} \text{ oz.}$   
 $\text{Ans.}$



$$(13) 776 \text{ fur.} + 99 = 7 \text{ fur. } 33 \text{ po. } 2 \text{ yds. } 2 \text{ ft. } 10 \text{ in. } \text{Ans.}$$

$$(14) \frac{50}{7}s. + \frac{32}{3}s. + 13\frac{20}{21}s. + \frac{3}{28}d. \\ = 13s. + \frac{394}{21}s. + \frac{3}{28}d. = 13s. + 18s. 9\frac{1}{4}d. \\ = 31s. 9\frac{1}{4}d. \text{ Ans.}$$

$$(15) \frac{50}{9}s. + \frac{56}{8}s. - \frac{35}{32}s. + 3\frac{1}{4}d. = \frac{22553}{1440}s. + 3\frac{1}{4}d. = 15s. 11\frac{89}{120}d. \\ \text{Ans.}$$

	cwt. qrs. lb. oz.
(16) $14\frac{1}{8} \text{ cwt.} + 7\frac{11}{20} \text{ cwt.}$	$= 21 \quad 2 \quad 24 \quad 4\frac{4}{16}.$
$15 \text{ lb. } 0\frac{1}{3}s. \text{ oz.} + 10\frac{2}{9} \text{ oz.}$	$= 0 \quad 0 \quad 15 \quad 10\frac{214}{315}.$
<i>Ans.</i>	cwt. 21    2    8 $9\frac{37}{63}.$

oz. dwt. grs.	oz. dwt. grs.
(17) $7 \quad 13 \quad 12\frac{6}{7} + \&c. = 25 \quad 15 \quad 11\frac{6}{7}$	
$10 \quad 10 \quad 11\frac{3}{7}$	
$5 \quad 17 \quad 3\frac{3}{7}$	$16 \quad 7 \quad 14\frac{6}{7}$
	oz. 9    7    21. <i>Ans.</i>

qu. bu. pks.	qu. bu. pks.
(18) $5 \quad 3 \quad 3\frac{4}{16}$	$0 \quad 4 \quad 3\frac{1}{16}$
$3 \quad 7 \quad 0\frac{1}{4}$	$1 \quad 4 \quad 0\frac{7}{16}$
$0 \quad 5 \quad 2\frac{7}{12}$	$2 \quad 0 \quad 3\frac{11}{16}$
$10 \quad 0 \quad 2\frac{5}{114}$	$- \quad 2 \quad 0 \quad 3\frac{11}{16}$
$= 7 \text{ qu. } 7 \text{ bu. } 2\frac{205}{228} \text{ pks. } \text{Ans.}$	

**Ex. 33.**

- (1)  $1 - \frac{35}{104} = \frac{69}{104}. \text{ Ans.}$   
 (2)  $(\frac{5}{8} + \frac{1}{2}) \text{ of } \frac{7}{16} + \frac{5}{12} = \frac{28}{48} + \frac{20}{48} = 1. \text{ Ans.}$   
 (3)  $1 - \frac{39}{116} \times \frac{2}{9} = \frac{77}{136}$ ; also  $\frac{1}{3}(\frac{29}{116} - \frac{2}{9}) = \frac{77}{136}. \text{ Ans.}$   
 (4)  $\frac{53\frac{29}{16}}{8\frac{3}{8}}$  of 15 cwt.  $= 15 \text{ cwt.} \times \frac{2997}{56} \times \frac{9}{74}$   
 $= \frac{1}{112}$  of 15 cwt.  $\times 81 \times 9 = 10935 \text{ lb.}$   
 $= 4 \text{ tons } 17 \text{ cwt. } 2 \text{ qrs. } 15 \text{ lb. } \text{Ans.}$

- (5)  $\frac{11}{20}$  done;  $\frac{9}{20}$  to be done; hence  
 $11 : 9 :: 8\frac{1}{2} \text{ da.} : 6\frac{3}{4} \text{ da.}$  *Ans.*
- (6)  $\frac{2\frac{1}{2} \times 5760}{3\frac{3}{4} \times 7000} = \frac{7 \times 1920 \times 4}{15 \times 7000} = \frac{64}{125}$ . *Ans.*
- (7)  $11 \text{ sq. yds. } 1\frac{1}{8} \text{ ft.} = 11\frac{11}{64} \text{ sq. yds.} = \frac{1}{4840} \text{ of } 11\frac{11}{64} \text{ ac.};$   
 $= \frac{1}{40} \text{ of } \frac{5}{64} \text{ ac.};$  hence  $\frac{3}{16} \text{ ac.} - \frac{1}{432} \text{ ac.} = \frac{5}{27} \text{ ac.}$  *Ans.*
- (8)  $1 - \frac{5}{21} = \frac{16}{21}$ ;  $\therefore \frac{18}{20}$  of  $\frac{16}{21}$  of what I had at first  
 $= 6s. 6d.$ ; or  $\frac{1}{108}$  of it  $= 1\frac{1}{2}d.$ ; hence I had at  
 first  $\frac{1}{8}$  of  $105s. = 13s. 1\frac{1}{2}d.$  *Ans.*
- (9)  $\frac{437}{5616}$  of a lb. of coffee is worth  $\frac{437}{288}$  of a penny;  
 $\therefore 1 \text{ lb. coffee is worth } 5616d. \div 288 = 1s. 7\frac{1}{2}d.$   
 $= 1st \text{ Ans.}$   
 Also,  $\frac{4}{13}$  of  $\frac{5}{14}$  of  $\frac{7}{2}$  of  $\frac{39}{2}d. - \frac{15}{8}d. = \frac{45}{8}d.$ ;  $\therefore \frac{5}{14}$  of  $\frac{7}{15}$   
 of  $\frac{5}{6}$  of 1 lb. tea is worth  $\frac{45}{8}d.$ ; hence 1 lb. tea  
 is worth  $3s. 4\frac{1}{2}d. = 2nd \text{ Ans.}$
- (10)  $F$  can do  $\frac{1}{20}$ , and  $S$   $\frac{1}{16}$ , of the work in 1 day;  
 $\frac{1}{20} + \frac{1}{16} = \frac{9}{80}$  by both together per day;  $\therefore$  the  
 whole in  $\frac{80}{9} \text{ da.} = 8\frac{8}{9} \text{ da.}$  *Ans.*
- (11)  $\frac{3}{10} + \frac{9}{16} - \frac{1}{12}$ , or  $\frac{187}{240}$  of 100 gall.  $= \frac{11}{12} \times \frac{15}{16} \times \frac{17}{18}$  of the  
 2nd cask;  $\therefore \frac{100}{240}$  of a gall.  $= \frac{15}{12 \times 16 \times 18}$  of 2nd  
 cask; or 1 gall.  $= \frac{1}{96}$  of it;  $\therefore$  the 2nd cask  
 contains 96 gall. *Ans.*
- (12) 3 hrs. 44 min.  $= 3\frac{11}{15}$  hrs.; hence both together do  
 $\frac{15}{68}$  of the work per hour, but  $B$  by himself only  
 $\frac{1}{8}$ ;  $\therefore A$  by himself,  $\frac{15}{68} - \frac{1}{8} = \frac{1}{7}$  per hour, or the  
 whole in 7 hours. *Ans.*
- (13)  $A$  with  $B$  and  $C$   $\frac{3}{8}$  of the work per day,  $A$  by  
 himself  $\frac{4}{35}$ ,  $B$   $\frac{1}{8}$ ;  $\therefore \frac{3}{8} - \frac{4}{35} - \frac{1}{8} = \frac{19}{140}$  by  $C$  per day;  
 or  $C$  could do the whole in  $7\frac{7}{19}$  days. *Ans.*

$$(14) 1\frac{3}{8} \text{ of the price of silver per ounce} = \frac{21s. \times 15}{40},$$

$$\text{hence } \frac{21s. \times 15}{40} + 1\frac{3}{8} = 4s. 11\frac{1}{16}d. \quad \text{Ans.}$$

$$(15) 1\frac{3}{4} \text{ of the fraction of } 21s. = 20s. \times \frac{49}{60}; \therefore \text{ the fraction} = \frac{980}{60}s. + \frac{7}{4} \text{ of } 21s. = \frac{2}{5} + \frac{3}{4} = \frac{5}{15}. \quad \text{Ans.}$$

(16) (i) By neither: a multiplier is always abstract, simply denoting the number of times that another quantity is to be taken.

(ii) 20s. cannot be divided by 5 cwt., for shillings and cwt. are concrete quantities of unlike kind; but 20s. can be divided by 3s. 4d., as containing 3s. 4d. a certain number of times; thus

20s.  $\div$  3 $\frac{1}{2}$ s. = 60s.  $\div$  10s. = 60  $\div$  10 = 6, an *abstract* value, though resulting from division of one concrete quantity by another.

$$(iii) 4\frac{7}{10} \text{ ac.} \times \frac{112 \text{ lb.} \times 61\frac{1}{2}}{501 \text{ lb.}} \times \frac{175d.}{12d. \times 287} = \frac{1}{10} \text{ ac.}$$

$$\times 20\frac{1}{2} \times 112 \times \frac{25}{12 \times 41} = 2 \text{ ac. } 3 \text{ ro. } 26\frac{2}{3} \text{ po.} \quad \text{Ans.}$$

$$(17) \left\{ \left( \frac{3}{28} + \frac{3}{40} \right) \times \frac{13}{14} + \frac{1}{85} \right\} \times \frac{25}{9} - \frac{3}{16}$$

$$= \left( \frac{31 \times 13}{200 \times 14} + \frac{80}{200 \times 14} \right) \times \frac{25}{9} - \frac{3}{16}$$

$$= \frac{23}{16 \times 3} - \frac{3}{16} = \frac{7}{24}. \quad \text{Ans.}$$

(18) *A* with *B* does  $\frac{3}{20}$  of the work per day,

*A* with *C* does  $\frac{2}{5}$  " "

*A* with *B* and *C* does  $\frac{1}{5}$  " "

$\therefore$  *C* does  $\frac{1}{5} - \frac{3}{20} = \frac{1}{20}$  of the work in 1 day, and *A*

does  $\frac{2}{15} - \frac{1}{20} = \frac{1}{12}$  of ditto, or the whole work in 12 days. *Ans.*

- (19) The joint effect of  $B$  and  $C$  running together is  $\frac{1}{8} - \frac{2}{9} = -\frac{1}{48}$  per hour; that is,  $\frac{1}{48}$  of the whole capacity of the cistern is discharged per hour; therefore the cistern would be again empty in 48 hours. *Ans.*
- (20) At 7 o'clock  $H$  is 35 minute spaces in advance of  $M$ , and we are to determine in what time after this  $M$  will have gained on  $H$   $35 - 15\frac{7}{8}$ , or  $19\frac{1}{8}$  spaces. Now,  $M$  gains on  $H$  55 spaces in every 60 minutes time; hence
- $55 : 19\frac{1}{8} :: 60 \text{ min.} : 20\frac{19}{22} \text{ min. past 7.}$
- But the required interval will again occur when  $M$  has gained on  $H$   $35 + 15\frac{7}{8}$ , or  $50\frac{7}{8}$  spaces; hence
- $55 : 50\frac{7}{8} :: 60 \text{ min.} : 55\frac{1}{2} \text{ min. past 7; } \therefore 20\frac{19}{22} \text{ min. past, and also } 55\frac{1}{2} \text{ min. past 7. } \textit{Ans.}$

**Ex. 34.**

- (1)  $\cdot 74$ ;  $\cdot 4$ ;  $\cdot 05$ .  
 (2)  $\cdot 125$ ;  $\cdot 7$ ;  $\cdot 016$ .  
 (3)  $\cdot 8048$ ;  $\cdot 009$ ;  $\cdot 07$ .  
 (4)  $\cdot 012$ ;  $\cdot 0026$ ;  $5\cdot 3$ .  
 (5)  $\cdot 02675$ ;  $3\cdot 07$ ;  $36\cdot 5$ .  
 (6)  $\cdot 0038$ ;  $7\cdot 364595$ ;  $\cdot 48$ .  
 (7)  $15\cdot 813$ ;  $9\cdot 090019$ ;  $6\cdot 00305$ .  
 (8)  $6\frac{1}{2}$ ;  $\frac{73}{200}$ ;  $17\frac{7}{25}$ ;  $\frac{3}{4}$ . (9)  $1\frac{1}{4}$ ;  $\frac{1}{8}$ ;  $\frac{7}{80}$ ;  $18\frac{21}{40}$ .  
 (10)  $\frac{3\frac{43}{5000}}{4000}$ ;  $\frac{3}{4000}$ ;  $\frac{16}{125}$ ;  $\frac{57}{5000}$ .  
 (11)  $\frac{359}{80}$ ;  $\frac{251}{600}$ ;  $1\frac{3}{825}$ ;  $20\frac{2912}{28125}$ .  
 (12)  $\frac{3}{32}$ ;  $\frac{5}{13}$ ;  $\frac{1}{160}$ ;  $1\frac{3}{2200}$ .  
 (13)  $235\cdot 6$ ;  $1\cdot 23$ ;  $7$ ;  $3504\cdot 5$ .  
 (14)  $3\cdot 45$ ;  $\cdot 47928$ ;  $3\cdot 5$ ;  $24\cdot 7$ .  
 (15)  $4\cdot 9$ ;  $1234500$ ;  $90$ ;  $4760500$ .  
 (16)  $\cdot 076$ ;  $\cdot 0225$ ;  $\cdot 00024$ ;  $\cdot 0000365$ .

**Ex. 35.**

- |               |               |               |
|---------------|---------------|---------------|
| (1) 342·6715. | (2) 85·41866. | (3) 3·6865.   |
| (4) 61·58125. | (5) 39·8945 ; | (6) 18·8822 ; |
|               | ·094804.      | 95·00907.     |
| (7) 78·75823. | (8) 5·198592. |               |

**Ex. 36.**

- |                   |                    |                 |
|-------------------|--------------------|-----------------|
| (1) 35·316.       | (2) 9·438.         | (3) 11537·0592. |
| (4) 64·47402.     | (5) ·2030376.      |                 |
| (6) 1·11100525.   | (7) ·0123471.      |                 |
| (8) ·01092025.    | (9) 92365.         | (10) ·1817751.  |
| (11) ·0009000684. | (12) 12·34533306.  |                 |
| (13) 879·491.     | (14) ·00059433221. |                 |
| (15) 6125.        | (16) 2·999824.     |                 |

**Ex. 37.**

- |                  |                    |                  |
|------------------|--------------------|------------------|
| (1) 2·789075.    | (2) ·0320625.      | (3) 37·824.      |
| (4) ·009765625.  | (5) ·026875.       | (6) 70·094.      |
| (7) ·000916.     | (8) ·004726.       | (9) 34·575.      |
| (10) 59·065.     | (11) ·0684.        | (12) 40·695.     |
| (13) 8·765.      | (14) 90·07.        | (15) 48·025.     |
| (16) ·6375.      | (17) ·080375.      | (18) 5·18.       |
| (19) 1270·08.    | (20) ·0123456, &c. | (21) 9·781, &c.  |
| (22) ·080644 +.  | (23) 69·351.       | (24) 47·00619 +. |
| (25) 11·34616 +. | (26) 291·47 +.     | (27) 365·0108 -. |
| (28) ·563365 +.  | (29) 496·03 -.     | (30) ·0684.      |
| (31) ·379505.    | (32) 647·31588.    |                  |

**Ex. 38.**

- |   |
|---|
| (1) ·6875 ; ·625 ; ·075 ; ·890625 ; 1·0078125 ; 3·056.            |
| (2) ·4167 - ; ·6111 + ; ·7143 - ; ·0769 + ; ·0075 + ;<br>·0161 +. |

- (3)  $\cdot 677419 +$ ;  $4\cdot 070976 -$ ;  $\cdot 096765 +$ ;  $9\cdot 021880 +$ ;  
 $\cdot 244231 -$ ;  $\cdot 091892 -$ .
- (4) a.  $\cdot 6$ ;  $\cdot 81$ ;  $\cdot 227$ ;  $\cdot 486$ ;  $\cdot 460317$ .  
 b.  $\cdot 99630$ ;  $\cdot 510726$ ;  $\cdot 70083682$ ;  $\cdot 13698630$ ;  
 $\cdot 1579573170$ .

**Ex. 39.**

- a.  $\frac{7}{9}$ ;  $\frac{22}{99}$ ;  $\frac{5}{33}$ ;  $\frac{4}{11}$ ;  $\frac{11}{27}$ .  
 b.  $\frac{4}{803}$ ;  $\frac{365}{369}$ ;  $\frac{4}{123}$ ;  $\frac{9}{13}$ ;  $\frac{41}{2161}$ .  
 c.  $\frac{1016}{1355}$ ;  $\frac{679}{5500}$ ;  $\frac{8321}{113628}$ ;  $\frac{1687}{5400}$ ;  $\frac{6}{35}$ .

**Ex. 40.**

- (1) £135; 65s. (2) £0019625; 829·44d.  
 (3) 16·5 farth.; £04952083.  
 (4) £9·4175; 2·646 hf. crs.  
 (5) 8·789458 cwt. (6) 182·697 ft.

**Ex. 41.**

- (1)  $\cdot 078125$ . (2)  $\cdot 2125$ . (3)  $\cdot 35146 +$ .  
 (4)  $\cdot 182073 -$ . (5)  $1\cdot 416$ . (6)  $3\cdot 2475$ .  
 (7)  $\cdot 3416$ . (8)  $\cdot 04265873 +$ . (9)  $\cdot 007962 +$ .  
 (10)  $\cdot 0493164\frac{1}{16}$ . (11)  $\cdot 0865384\frac{8}{13}$ . (12)  $\cdot 0083$ .  
 (13)  $3\cdot 7969677 -$ . (14)  $\cdot 0065839\frac{2}{7}$ .

**Ex. 42.**

- (1) £2 13s. 9d.; 19s.  $8\frac{1}{4}d$ .;  $10\cdot 47d$ .  
 (2) £26 2s.  $5\frac{1}{2}d$ .; 17s.  $5\frac{2}{5}d$ .; £13 14s.  $7\frac{1}{4}d$ .  
 (3)  $2\frac{1}{4}d$ .; 8s.  $1\cdot 824d$ .; 9s.  $4\frac{8}{11}d$ .  
 (4) 24s.  $6\cdot 715 + d$ .; £16 0s.  $11\frac{1}{2}d$ . +.  
 (5) 4 cwt. 3 qrs.  $16\frac{1}{2}lb$ .; 1 lb. 15 dwt.  $21\frac{3}{4}grs$ .;  
 3 da. 11 hrs. 44 min.  $18\frac{2}{5}sec$ .

**Ex. 43.**

(1) 1020·304304.

(2) Here  $\frac{8}{27} + \frac{5}{24} = \frac{109}{216}$ ;  $\frac{7}{26} - \frac{4}{39} = \frac{1}{6}$ ;  $\frac{6}{25} = \cdot 24$ ;  
hence  $\cdot 5046296 + \cdot 1666666 - \cdot 24 = \cdot 431296$ . *Ans.*

(3)  $\cdot 030137 \times 365 = 11$  days. *Ans.*

(4)	1·3915 ton	(5) ·0625
	7	·084337
	9·7405	·146837
10s. = $\frac{1}{2}$	·69575	·011628
6d. = $\frac{1}{20}$	·0347875	·135209. <i>Ans.</i>
	10·4710375	

= £10 9s. 5·049d. *Ans.*

(6) 3·965 oz. : 12 oz.  $\times \cdot 3538 ::$  £15·21 : £16·2864. *Ans.*

(7)  $\frac{102 \times 8}{187 \times 7}$  of  $\frac{\cdot 00924}{\cdot 36} = \frac{48}{77}$  of  $\frac{77}{3000} = \cdot 016$ . *Ans.*

(8)	9·281
	3
	27·843
12s. = $\frac{1}{6}$	5·5686
1s. 8d. = $\frac{1}{12}$	·773417
$\frac{5}{10}$ d. = $\frac{1}{40}$	·019335
$\frac{1}{10}$ d. = $\frac{1}{5}$	·003867
$\frac{1}{10}$ d. = $\frac{1}{5}$	·003867
	34·212086 = £34 4s. 2·9d. <i>Ans.</i>

(9) 178·6 dwt. : 328·32 dwt.  $::$  44·18s.,  
or 1786000 : 32832  $::$  4418s. : 81·216s. *Ans.*

$$\begin{array}{rcl}
 \text{£} & \text{s.} & \text{d.} \\
 (10) & 5 & 17 \quad 5\frac{3}{4} = 5.874 - \\
 & 7 & 3 \quad 10 = 7.192 - \\
 & 0 & 13 \quad 7\frac{3}{4} = .682 + \\
 \hline
 \end{array}$$

$$13 \ 14 \ 11\frac{1}{2} = 13.748. \quad \text{Ans.}$$

$$\begin{aligned}
 (11) \quad 1760 \text{ yds.} &= 1609.3 \text{ mètr., or } 1600 \text{ yds.} = 1463 \text{ mètr.;} \\
 \therefore 1 \text{ yd.} &= \frac{1463}{1600} \text{ mètr.} \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (12) \quad \frac{2}{3} \text{ of } .3127 &= \frac{.3127}{15000} \text{ of } 1 = \frac{3127}{15 \times 3599} \text{ of } 3.599 \\
 &= \frac{53}{15 \times 61} \text{ of } 3.599; \text{ hence}
 \end{aligned}$$

$$38690 : 417\frac{15}{32} :: \frac{53}{15 \times 61} : \frac{1}{1600}. \quad \text{Ans.}$$

$$\begin{aligned}
 (13) \quad 68 : 100 &:: 529 : 778 \text{ very nearly;} \\
 1000 : 293 &:: 529 : 155 \quad \text{,,} \\
 \text{hence the fractions are} &\frac{529}{778} \text{ and } \frac{155}{629}. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (14) \quad \frac{4 \text{ qrs.} \times 2967}{5 \text{ qrs.} \times 49450} &= \frac{6}{125}; \text{ and } \frac{20s. \times 10206}{21s. \times 18500} = \frac{486}{925}; \\
 \text{hence } \frac{6}{125} + \frac{486}{925} &= \frac{37}{405}. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (15) \quad \frac{78\frac{1}{2}}{10} &= \frac{1000}{128}. \text{ The son walked in all } 115.626 \text{ yds.} \times \frac{1000}{128} \\
 &= 903\frac{21}{64} \text{ yds., which subtracted from } 1760 \text{ yds.} \\
 &\text{gives } 856\frac{43}{64} \text{ yds. walked by the father in } \frac{1000}{128} \text{ min.;} \\
 \text{hence } \frac{54927}{64} \times \frac{128}{1000} &= 109.654 \text{ yds. per min.} \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (16) \quad 14.706 \text{ times the required multiplier} &\text{ is equal to } 912 \\
 \text{times } .005289; \text{ hence } \frac{5289 \times 912}{14706000} &= .328. \quad \text{Ans.}
 \end{aligned}$$



(17) Sum,  $\frac{98}{98} = 1.152941$

diff.,  $\frac{85}{98} = .867947$

$$\left. \begin{array}{l} \frac{1}{2} \text{ of } 2.020288 = 1.010144 \\ \frac{1}{2} \text{ of } .285594 = .142797 \end{array} \right\} \text{Ans.}$$

(18) First,  $1 - .304$  leaves  $.696$ ; then  $.696 - .304$  of  $.696$  leaves  $.696$  of  $.696$  of the journey  $= 75.69$  miles;

$$\therefore \text{the whole journey} = \frac{75690000}{696 \times 696} = \frac{90000}{24 \times 24}$$

$$= 156\frac{1}{4} \text{ mi. Ans.}$$

(19) At 9 o'clock  $M$  is 15 spaces before  $H$ ; but at 10.38 min. past 9  $H$  will have advanced  $\frac{10.38}{60}$  of 5 spaces,

or  $\frac{1}{12}$  of 10.38 spaces; and then  $M$  will be in advance of  $H$   $25.38 - .865$  spaces  $= 24.515$ . *Ans.*

(20) i.  $A$  supplies  $\frac{100}{447}$  of the cistern's capacity per hour, and  $C$  discharges  $\frac{1}{5}$  per hour;

$$\therefore \frac{100}{447} - \frac{1}{5} = \frac{53}{2235} \text{ gained per hour; and the cistern would be full in } \frac{2235}{53} \text{ hrs.} = 42.17 \text{ hrs. First Ans.}$$

ii.  $B$  supplies  $\frac{100}{609}$  and  $C$  discharges  $\frac{1}{5}$  per hour;

$$\therefore \frac{1}{5} - \frac{100}{609} = \frac{109}{3045} \text{ lost per hour; and the cistern would be again empty in } \frac{3045}{109} \text{ hours} = 27.93578 - \text{hrs. Second Ans.}$$

#### Ex. 44.

(1) £49 9s. 5 $\frac{3}{4}$ d.

(2) £6 15s. 9d.; 1s. 6 $\frac{3}{20}$ d.

(3) £31 6s. 1 $\frac{1}{5}$ d.

(4) £1 18s. 3 $\frac{9}{40}$ d.

(5) 3 gall. 1 qt. 1 $\frac{3}{8}$  pt.; 12 lb. 9 $\frac{169}{175}$  oz.

(6) 20s. 8 $\frac{1}{2}$ d.

(7) 23s. 9d.

(8)  $100 : 108\frac{3}{4} :: 14652 : 15934$ . *Ans.*

(9)  $100 : 56.36 :: 246 \text{ lb.} : 131 \text{ lb. } 4\frac{1}{4} \text{ oz.}$  *Ans.*

(10)  $30d. : 19\frac{1}{2}d. :: 100 : 65 \text{ per cent.}$  *Ans.*

$$(11) \text{ £147 } 14s. \text{ } 2d. : \text{ £5 } 3s. \text{ } 4\frac{3}{4}d. :: 100 : 8\frac{1}{2}. \text{ Ans.}$$

$$(12) \text{ £172 } 10s. : \text{ £38 } 16s. \text{ } 3d. :: 100 : 22\frac{1}{2}. \text{ Ans.}$$

$$(13) \text{ 306s. } 3d. : \text{ 37s. } 10\frac{1}{2}d. :: 100 : 12\cdot36. \text{ Ans.}$$

$$(14) \text{ £54 : £12 :: 100 : } 22\frac{2}{3}. \text{ Ans.}$$

$$(15) \text{ 20s. : } 5\frac{1}{2}s. :: 100 : 26\frac{2}{3}. \text{ Ans.}$$

$$(16) \text{ 100 : 82 :: 6s. } 6d. \times 25 : \text{ £6 } 13s. \text{ } 3d. \text{ Ans.}$$

	$\text{£}$	$s.$	$d.$
(17) Gross amount	37	12	8
5 per cent. off = $\frac{1}{20}$	1	17	$7\frac{3}{5}$
Net amount	35	15	$0\frac{2}{5}$

*Ans.*

$$(18) \text{ 26870 : 5920 :: 100 : 22\cdot032. Ans.}$$

$$(19) \text{ 31s. } 6d. : 4\frac{1}{2}d. \times 112 :: 100 : 133\frac{1}{2}, \text{ showing a gain of } 33\frac{1}{2} \text{ per cent. Ans.}$$

$$(20) \text{ 16 tons sold at £9 } 16s. = \text{ £156 } 16s.$$

$$\begin{array}{r} 19 \quad \quad \quad 9 \quad 9 \\ \hline \end{array} = 179 \quad 11$$

$$35 \text{ tons sold for } . . . \text{ £336 } 7s.;$$

$$,, \quad ,, \text{ bought for } . \quad \text{ £7 } 15s. \times 35;$$

$$155s. \times 35 : 6727s. :: 100 : 124;$$

$$\text{showing a gain of } 24 \text{ per cent. Ans.}$$

$$(21) \text{ 125d. : } 10\frac{1}{2}d. \times 14 :: 100 : 117\frac{3}{5};$$

$$\text{showing a profit of } 17\frac{3}{5} \text{ per cent. Ans.}$$

$$(22) \text{ 966d. : } 11\frac{1}{2}d. \times 112 :: 100 : 133\frac{1}{2};$$

$$\text{showing a gain of } 33\frac{1}{2} \text{ per cent. Ans.}$$

$$(23) \frac{147s.}{78} \text{ per yd. : } \frac{42s.}{25} \text{ per yd. :: 100 : } 89\frac{1}{7};$$

$$\text{showing a loss of } 10\frac{6}{7} \text{ per cent. Ans.}$$

$$(24) \text{ } 3\frac{1}{2} : 100 :: \text{ £3 } 17s. \text{ } 6\frac{3}{10}d.;$$

$$\begin{array}{r} 10 \\ \hline \end{array}$$

$$\text{or } 1 : 3 :: \text{ £38 } 15s. \text{ } 3d. : \text{ £116 } 5s. \text{ } 9d. \text{ Ans.}$$

$$(25) 2\frac{3}{4} : 100 :: £43\ 19s.\ 1d. : £1598\ 6s.\ 8d. \quad Ans.$$

$$(26) \frac{1}{8} : 100 :: £3\ 7s.\ 9d. : £2710. \quad Ans.$$

$$(27) 112\frac{1}{2} : 100 :: 40\frac{1}{2} \text{ guin.} : 36 \text{ guin.} \quad Ans.$$

$$(28) 117\frac{1}{4} : 100 :: £22\frac{1}{2} \times 20 : £380\ 19s.\ 0\frac{1}{4}d. \quad Ans.$$

$$(29) 116\frac{1}{8} : 100 :: 3s.\ 5d. : 2s.\ 11\frac{5}{17}d. \quad Ans.$$

$$\begin{array}{rcl} (30) & 364 : 183 :: 100 : 50\cdot275 - \\ & \text{,,} : 97 :: \text{,,} : 26\cdot648 + \\ & \text{,,} : 84 :: \text{,,} : 23\cdot077 - \end{array} \left. \vphantom{\begin{array}{l} 364 \\ 183 \end{array}} \right\} \quad Ans.$$


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364
100·0

$$(31) 89\frac{1}{4} : 100 :: 43605 : 48857. \quad Ans.$$

$$(32) 93\frac{1}{3} : 100 :: 8\frac{3}{4}d. \times 12 : 9s.\ 4\frac{1}{2}d. \quad Ans.$$

$$(33) 127\frac{1}{2} : 100 :: 28s.\ 4d. \times 63 : £70. \quad Ans.$$

$$(34) 108 : 112 :: 6s.\ 9d. : 7s. \quad Ans.$$

$$(35) 3s.\ 4d. : 3s. :: 102\frac{1}{2} : 92\frac{1}{4};$$

showing a loss of  $7\frac{3}{4}$  per cent. *Ans.*

$$(36) 93\frac{3}{8} : 101\frac{5}{8} :: 18s. : 19s.\ 7d. \quad Ans.$$

$$(37) 109\frac{1}{3} : 112\frac{3}{4} :: 6s.\ 4d. : 6s.\ 6\frac{3}{8}d. \quad Ans.$$

$$(38) 43\frac{1}{2}s. : 40s. :: 108\frac{3}{4} : 100;$$

showing that nothing would be gained or lost, but  
merely the prime cost recovered. *Ans.*

$$(39) 43s.\ 9d. + 13 : 80s. + 25 :: 140 : 133\frac{3}{25};$$

showing a gain of  $33\frac{3}{25}$  per cent. *Ans.*

$$(40) 96\frac{1}{4} : 98\frac{3}{4} :: £7\ 14s. : £7\ 18s. \quad Ans.$$

$$(41) 2 \text{ lb. at } 1s.\ 10d. = 3s.\ 8d.$$

$$1 \text{ lb. at } 1s.\ 7d. = 1\ 7$$

$$3 \text{ lb. sold for } 5s.\ 3d. \text{ having cost } 4s.\ 6d.;$$

$$4s.\ 6d. : 9d. :: 100 : 16\frac{2}{3} \text{ per cent.} \quad Ans.$$

	£	s.	d.
(42) 56 yds. bought at 4s. 7d.	12	16	8
Proposed profit, 15 per cent.	1	18	6
	14	15	2
42 yds. sold at 5s. 5d.	11	7	6
14 yds. must be sold for	3	7	8
that is, at 4s. 10d. the yard.	<i>Ans.</i>		

	£	s.
(43) 96 gall. bought at 14s. 7d.	70	0
Proposed profit, 18 per cent.	12	12
	82	12
28 gall. sold at 16s. 6d.	23	2
68 gall. must be sold for	59	10
that is, at 17s. 6d. a gall.	<i>Ans.</i>	

- (44) Each egg costs  $\frac{11}{12}d.$  ;  
 $100 : 119 :: \frac{11}{12}d. : \frac{1309}{1200}d.$  selling price of 1 ;  
 that is, they are to be sold at the rate of 1200 for  
 1309d. ;  
 $1309d. : 12d. :: 1200 \text{ eggs} : 11 \text{ eggs, very nearly.}$   
*Ans.*

	£	s.	d.
(45) 240 chairs bought for	46	0	0
$1\frac{1}{4}$ per cent. loss	0	11	6
	45	8	6
137 chairs sold at 4s.	27	8	0
103 chairs sold for	18	0	6
that is, at 3s. 6d. each.	<i>Ans.</i>		

- (46)  $100 : 96\frac{1}{4} :: 36 \text{ gall.} : 34\frac{13}{20} \text{ gall. sold., which at } 7d.$   
 a quart amounts to  $970\frac{1}{5}d.$ ;  
 hence  $\pounds 3 = 720d. : 970\frac{1}{5}d. :: 100 : 134\frac{3}{4}$ ;  
 showing a gain of  $34\frac{3}{4}$  per cent. *Ans.*
- (47)  $A$ 's money is to  $B$ 's as  $101\frac{5}{8}$  is to 100; and we are  
 to find how much per cent.  $1\frac{5}{8}$  is of  $101\frac{5}{8}$ ; thus,  
 $101\frac{5}{8} : 1\frac{5}{8} :: 100 : 1\cdot599 + \text{per cent.,}$   
 or  $1\frac{5}{8}$  per cent. *very nearly. Ans.*
- (48) 1st : 2nd  $:: 98\cdot28 : 100$ ; and we are to find how  
 much per cent.  $1\cdot72$  is of  $98\cdot28$ ; thus,  
 $98\cdot28 : 1\cdot72 :: 100 : 1\cdot7501 \text{ per cent.,}$   
 or  $1\frac{3}{4}$  per cent. *very nearly. Ans.*

**EX. 25.**

	£	s.	d.
(1) $[\frac{3}{20}]$	8	13	$4\frac{1}{2}$ .
(2) $[\frac{9}{100}]$	12	2	$5\frac{1}{4}$ .
(3) $[\frac{12}{100}]$	98	10	$4\frac{1}{2}$ .
(4)	1	17	$1\frac{1}{4}$ .
(5) $[\frac{1}{5}]$	53	18	$4\frac{1}{4}$ .
(6) $[\frac{9}{50}]$	19	8	$9\frac{3}{8}$ .
(7) $[\frac{1}{20} \text{ of } 1\frac{1}{2}]$	73	12	$1\frac{4}{5}$ .
(8)	60	14	7·85.
(9) $[\frac{3}{40}]$	9	2	$4\frac{7}{32}$ .
(10) $[\frac{10\frac{1}{2}}{100}]$	122	5	$4\frac{49}{80}$ .
(11)	37	17	5·96.
(12) $[\frac{11}{10}]$	159	18	$5\frac{1}{16}$ .
(13) $[\frac{1\frac{1}{2} \times 11}{100}]$	207	5	2·055.
(14) $[\frac{5\frac{1}{4}}{20}]$	48	14	9.

	$\pounds$	$s.$	$d.$
(15) $\left[\frac{6 \times 3}{100}\right]$	377	8	$3\frac{3}{8}$ .
(16) $\left[\frac{3\frac{1}{4}}{20}\right]$	6	4	$5\frac{1}{2}$ .
(17) $\left[\frac{1}{8}\right]$	18	8	$4\frac{3}{16}$ .
(18) $\left[\frac{3}{20}\right]$	10	10	$10\frac{1}{20}$ .
(19) $\left[\frac{1}{10}\right]$	38	19	$3\frac{3}{8}$ .
(20) $\left[\frac{7 \times 7}{4 \times 80}\right]$	112	3	$9\frac{1}{2}$ .
(21)	5581	8	0.
(22)	722	18	$0\frac{3}{8}$ .
(23) $\left[\frac{1}{5}\right]$	609	12	9.
(24) $\left[\frac{6 \times 3}{100}\right]$	114	8	$7\cdot32$ .
(25) $\left[\frac{1\frac{1}{16}}{12}\right]$	1713	18	$2\frac{1}{2}$ .
(26) $\left[\frac{1}{10 \times 12}\right]$	0	7	$3\cdot367-$ .
(27) $\left[\frac{1\frac{1}{2}}{100}\right]$	16	8	$10\cdot59$ .
(28) $\left[\frac{3}{80}\right]$	17	15	$5\frac{1}{4}$ .
(29) $\left[\frac{1\frac{1}{2}}{80}\right]$	0	9	$6\cdot58$ .
(30) $\left[\frac{1\frac{1}{2}}{20}\right]$	151	2	$4\frac{3}{4}$ .
(31) $\left[\frac{2 \times 1\frac{1}{2}}{100}\right]$	81	5	$0\frac{1}{4}$ .
(32) $\left[\frac{1\frac{1}{12}}{40}\right]$	370	10	$4\frac{7}{8}$ .

	£	s.	d.
(33) $\left[\frac{3}{80}\right]$	0	12	$2\frac{1}{4}$ .
(34) $\left[\frac{12}{13 \times 100}\right]$	6	5	9.96.
(35)	0	4	1.43.
(36) $\left[\frac{4 \times 7}{7300}\right]$	0	11	1.01.
(37)	46	13	$7\frac{23}{25}$ .
(38) $\left[\frac{1}{30}\right]$	63	17	0.
(39)	40	1	$1\frac{62}{73}$ .
(40)	7	7	7+.

(41) 5 p.c. for 3 yrs. = 15 p.c.

15 : 100 :: £20 15s.  $5\frac{1}{4}$ d. : £138 9s. 7d. *Ans.*

(42)  $1\frac{1}{2}$  : 100 :: £19 18s. : £1326 13s. 4d. *Ans.*

(43) 4 p.c. for  $3\frac{1}{2}$  yrs. = 14 p.c.

14 : 100 :: £6 18s. 10d. : £49 11s. 8d. *Ans.*

(44) £78 3s.  $7\frac{3}{4}$ d. :  $\frac{1}{4}$  of £7 16s.  $4\frac{3}{8}$ d. :: 100,  
or £312 14s. 7d. : £7 16s.  $4\frac{3}{8}$ d. :: 100 :  $2\frac{1}{2}$ . *Ans.*

(45)  $3870 : 100$  } :: 1 yr. : 5 yrs. *Ans.*  
 $3\frac{1}{2} : 619\frac{1}{2}$  }

(46)  $1116\frac{7}{8} : 100$  } ::  $335\frac{1}{16} : 4\frac{1}{2}$ . *Ans.*  
 $6\frac{2}{3}$  yrs. : 1 yr. }

(47) £12 15s. 5d. : £100 } :: 12 mo.  
£2 $\frac{3}{4}$  : 35.12d. }

or  $3065 \times 11 : 14048$  :: 12 mo. : 5 mo. *Ans.*

(48) £1724 0s. 4d. : £100 } :: 1 yr.  
£3 $\frac{1}{2}$  : £23 12s. 4d. }

or  $103441 : 1417 \times 30$  :: 1 yr. :  $\frac{80}{73}$  yr. = 150 days.  
*Ans.*

- (49) Amount of 100 =  $100 + 5 \times 3 = 115$ ;  
 $115 : 100 :: £763 \text{ 10s. 1d.} : £663 \text{ 18s. 4d.}$  *Ans.*
- (50) Amount of 100 =  $100 + 3\frac{1}{2} \times 3\frac{1}{4} = 110\frac{5}{32}$ ;  
 $110\frac{5}{32} : 100 :: £80 \text{ 9s. 9d.} : £73 \text{ 1s. 4d.}$  *Ans.*
- (51) Amount of 100 =  $100 + \frac{11}{12}$  of  $4\frac{1}{2} = 104\frac{1}{2}$ ;  
 $104\frac{1}{2} : 100 :: £334 \cdot 761875 : £321 \text{ 10s.}$  *Ans.*
- (52) Amount of 100 =  $100 + \frac{25}{345}$  of 4 =  $100\frac{28}{73}$ ;  
 $100\frac{28}{73} : 100 :: £214 \cdot 9,$   
 or  $7368 : 730 :: £2149 : £212 \text{ 18s. 4d.}$  *Ans.*

**Ex. 46.**

	£	s.	d.		£	s.	d.
(1)	292	3	3.	(2)	339	13	9·744.
(3)	90	1	1·195.	(4)	210	12	9·984.
(5)	49	11	1 $\frac{1}{4}$ .	(6)	4416	6	3·097.
(7)	579	9	11·788.	(8)	1183	5	1·394.
(9)	70	3	0·812.	(10)	229	5	11·044.
(11)	79	8	2·618.	(12)	120	19	0·577.

**Ex. 47.**

	£	s.	d.		£	s.	d.
(1)	183	0	0	(2)	1	14	3.
(3)	52	12	0 $\frac{12}{43}$ .	(4)	122	16	1 $\frac{12}{15}$ .
(5)	52	7	2 $\frac{2}{3}$ .	(6)	2	8	6 $\frac{17}{18}$ .
(7)	0	12	7 $\frac{1}{2}$ .	(8)	7	12	11 $\frac{5}{17}$ .
(9)	38	16	0.	(10)	126	9	2.
(11)	694	8	10 $\frac{2}{3}$ .	(12)	28	16	0.
(13)	14	2	5 $\frac{2}{7}$ .	(14)	42	6	1 $\frac{7}{11}$ .
(15)	441	0	10.				

**Ex. 48.**

- (1) £292 0s. 6d. (2) £1 6s. 11d.  
 (3) £6 2s. 4 $\frac{4}{17}$ d.; £6 5s. 8d.



- (4) Bill drawn Sept. 27, due Nov. 30. From Oct. 10 to Nov. 30 are 51 days. Deducting 51 days' interest from £213 16s. 6d. gives £212 6s. 7d. *Ans.*
- (5) Bill drawn May 9, due Aug. 12. From June 1 to Aug. 12 are 72 days; hence int. = 9s. 5d. *Ans.*
- (6) Bill drawn Dec. 17, due Jan. 20. From Dec. 26 to Jan. 20 are 25 days; the interest for which being deducted gives £512 17s. 8d. *Ans.*

**Ex. 49.**

- (1)  $5 + 7 + 9 = 21$ ; hence  $\frac{5}{21}$ ,  $\frac{7}{21}$ , and  $\frac{9}{21}$  of 105 give 25, 35, 45. *Ans.*
- (2)  $\frac{8}{18}$ ,  $\frac{7}{18}$ , and  $\frac{3}{18}$  of 27 give 12,  $10\frac{1}{2}$ ,  $4\frac{1}{2}$ . *Ans.*
- (3) The parts are as 14, 19, and 23; whence 5s. 3d.; 7s.  $1\frac{1}{2}$ d., 8s.  $7\frac{1}{2}$ d. *Ans.*
- (4)  $\frac{890}{8125}$ ,  $\frac{800}{8125}$ , &c., of 100 give 28.48, 25.6, 23.52, 22.4 per cent. *Ans.*
- (5)  $A$  is to  $B$  as 1 to  $\frac{5}{7}$ , or 7 to 5; hence  $\frac{7}{12}$  and  $\frac{5}{12}$  of £100 give £58 6s. 8d. to  $A$ , £41 13s. 4d. to  $B$ . *Ans.*
- (6)  $\frac{14}{27}$  and  $\frac{13}{27}$  of 162 give 84 and 78. *Ans.*
- (7) The 2nd =  $\frac{2}{3}$  of 1st, and the 3rd =  $\frac{4}{5}$  of  $\frac{2}{3}$  of 1st;  $\therefore$  the areas are as 1,  $\frac{2}{3}$ ,  $\frac{8}{15}$ , or as 35, 14, 8; hence  $\frac{35}{57}$ ,  $\frac{14}{57}$ ,  $\frac{8}{57}$  of  $14\frac{1}{4}$  acres give  $8\frac{1}{2}$ ,  $3\frac{1}{2}$ , and 2 acres. *Ans.*
- (8) The shares are as 1,  $\frac{7}{8}$ , and  $\frac{5}{8}$  of  $\frac{7}{8}$ , or as 48, 42, 35; hence  $\frac{48}{125}$ ,  $\frac{42}{125}$ ,  $\frac{35}{125}$  of £1000 give £384, £336, and £280. *Ans.*

- (9) The three values are as 20s., 2s. 6d., and 2s., which amount to 24s. 6d.; viz.  $\frac{244}{392}$  or  $\frac{1}{16}$  of the amount actually divided; hence 16 of each coin were paid. *Ans.*
- (10) The 2nd has  $\frac{105}{100}$  of the 1st, and the 3rd  $\frac{107}{100}$  of  $\frac{105}{100}$  of the 1st;  $\therefore$  the shares are as 1,  $\frac{105}{100}$ , and  $\frac{11235}{10000}$ , or as 10000, 10500, and 11235, or as 2000, 2100, and 2247; hence  $\frac{2000}{6347}$ , &c., of £461 12s. give £145 9s. 1  $\frac{1}{11}$ d., £152 14s. 6  $\frac{6}{11}$ d., £163 8s. 4  $\frac{4}{11}$ d. *Ans.*
- (11) The 2nd is  $\frac{7}{9}$  of the 1st, and the 3rd is  $\frac{9}{12}$  of  $\frac{7}{9}$  of the 1st;  $\therefore$  the numbers are as 1,  $\frac{7}{9}$ , and  $\frac{7}{12}$ , or as 36, 28, 21; hence  $\frac{28}{85}$ , &c., of 1105 give 468, 364, 273. *Ans.*
- (12) The four sums give equal products when multiplied by 6, 7, 9, and 10;  $\therefore$  the 2nd is  $\frac{6}{7}$  of the 1st, the 3rd is  $\frac{7}{9}$  of the second, and the 4th is  $\frac{9}{10}$  of the 3rd; or the sums are as 1,  $\frac{6}{7}$ ,  $\frac{7}{9}$  of  $\frac{6}{7}$ , and  $\frac{9}{10}$  of  $\frac{7}{9}$  of  $\frac{6}{7}$ , or as 630, 540, 420, and 378. Now the difference of the greatest and least of these is 252; hence  $\frac{630}{252}$ ,  $\frac{540}{252}$ , &c., of £14 14s. give £36 15s., £31 10s., £24 10s., and £22 1s. *Ans.*

**EX. 50.**

- (1) 27. (2) 31. (3) 45. (4) 73. (5) 91.  
 (6) 128. (7) 209. (8) 187. (9) 593. (10) 908.  
 (11) 2763. (12) 3507. (13) 6820. (14) 8096.  
 (15) 5·67. (16) 98·5. (17) 6·408. (18) ·3198.  
 (19) 4·89898—. (20) 2·236068—. (21) 11·874355—.  
 (22) 5·38516+. (23) 290080. (24) 71414·985+.

- (25) 492107. (26) 665·544. (27) 1083·69—.  
 (28) 30·28062+. (29) ·2766586+. (30) ·031624+.  
 (31) ·0258186—. (32) 38·00919+. (33)  $\frac{23}{29}$ .  
 (34) ·661438—. (35) ·771517—. (36) ·2847474—.  
 (37) ·202. (38) ( $\cdot 726476 - \cdot 542326$ ) +  $\cdot 029 = 6\cdot35$ . *Ans.*  
 (39)  $99^2 \times 24 = 235224$ ; hence by extracting it is found  
 that 1 must be added, making the root 485. *Ans.*  
 (40) Whole amount in pence =  $306\cdot25$ , the square root  
 of which is  $17\frac{1}{2}$  = the no. of lbs. *Ans.*  
 (41) ( $\sqrt{5112\cdot25 \times 3 - 46\frac{1}{2}} + 3$ ) is equal to the square root  
 of the original number =  $(71\cdot5 \times 3 - 46\cdot5) + 3 = 56$ ;  
 hence the original no. is 56 squared = 3136. *Ans.*  
 (42)  $1 - \frac{1}{2 - \frac{1}{2\frac{3}{4}}} = 1 - \frac{1}{2 - \frac{4}{11}} = 1 - \frac{11}{18} = \frac{7}{18}$ ; the square root  
 of which =  $\sqrt{\frac{14}{36}} = \frac{1}{6}\sqrt{14}$ ; hence the required  
 fraction is  $\frac{1}{6}$ . *Ans.*

